This document gives pertinent information concerning the reissuance of the VPDES Permit listed below. This permit is being processed as a **Major**, **Municipal** permit. The discharge results from the operation of a 30 mgd wastewater treatment plant with a planned expansion to a 40 mgd design flow tier. The effluent limitations and special conditions contained in this permit will maintain the Water Quality Standards of 9 VAC 25-260-00 et seq.

1.

Facility Name and Mailing Address:	Arlington County WPCP 3402 South Glebe Road Arlington, VA 22202	SIC Code:	4952 WWTP
Facility Location:	3402 South Glebe Road Arlington, VA 22202	County:	Arlington
Facility Contact Name:	Larry Slattery	Telephone Number:	703-228-6820

2.

Permit No.:	VA0025143	Expiration Date of previous permit:	September 16, 2008
Other VPDES Permits associated with this facility:		VAR051421, VAN010021	
Other Permits associated with this facility:		Air (Registration No. 70026) VWP Permit No. 04-2744 Hazardous Waste (EPA ID VAD98720411) 18 UST and 3 AST Registration Sites (3011817)	
E2/E3/E4 Status:	N/A		

3.

Owner Name:	Arlington County Board		
Owner Contact/Title:	Victoria Greenfield, Director, Utilities and Environmental Planning Division	Telephone Number:	703-228-3602

4.

Application Complete Date:	5/21/2008		
Permit Drafted By:	Anna T. Westernik	Date Drafted:	7/7/2008
Draft Permit Reviewed By:	Alison Thompson	Date Reviewed:	7/18/2008, 7/21/2008
Public Comment Period:	Start Date: 8/22/2008	End Date:	9/22/2008

5. Receiving Waters Information: The flow values derived from USGS Gaging Station 01652500 located on Four Mile Run. See **Attachment 1** for flow frequencies information.

Receiving Stream Name:	Four Mile Run		
Drainage Area at Outfall:	17 sq.mi.	River Mile:	1.27
Stream Basin:	Potomac	Subbasin:	Lower Potomac River
Section:	6	Stream Class:	II
Special Standards:	b, y,	Waterbody ID:	VAN-A12E
7Q10 Low Flow	0.55 mgd	30Q5 Flow:	1.5 mgd
1Q10 Low Flow	0.43 mgd	30Q10 Low Flow:	1.2 mgd
Harmonic Mean Flow:	3.3 mgd	30Q10 High Flow	1.7 mgd
303(d) Listed:	Yes		
TMDL Approved:	Yes	Date TMDL Approved:	October 31, 2007 (PCBs)

6. Statutory or Regulatory Basis for Special Conditions and Effluent Limitations:

- ✓ State Water Control Law
- ✓ Clean Water Act
- ✓ VPDES Permit Regulation
- ✓ EPA NPDES Regulation
- ___ EPA Guidelines
- ✓ Water Quality Standards
- ✓ Other: Policy for the Potomac River Embayments (9 VAC 25-415-10 et seq.)

7. Licensed Operator Requirements: Class I

8. Reliability Class: Class I

9. Permit Characterization:

___	Private	✓	Effluent Limited	✓	Possible Interstate Effect (D.C.)
___	Federal	✓	Water Quality Limited	___	Compliance Schedule Required
___	State	✓	Toxics Monitoring Program Required	___	Interim Limits in Permit
✓	POTW	✓	Pretreatment Program Required	___	Interim Limits in Other Document
✓	TMDL				

10. Wastewater Treatment Description:
The current plant design capacity is 30 mgd, with a proposed expansion flow tier of 40 mgd. Future upgrades being planned by the County are listed below.

Master Plan Upgrades (All items are expected to be completed by March 2011.)
- Change gravity filters and carbon tanks to monomedia or other denitrification filters;
- Add two or more clarifiers;
- Add two or more aeration tanks;
- Add an additional 11.3 MG of equalization tank volume (two tanks);
- Improve screenings;
- Install a multipoint ferric feed system;
- Treat or reroute recycle flows;
- Add methanol storage and feed facilities;
- Modify present aeration tanks to achieve further nitrogen reduction; and
- Upgrade the lift stations.

Attachment 2 is a schematic of the plant operation. Plant treatment processes include: preliminary, primary, secondary, tertiary treatment, and sludge dewatering. Three odor control treatment systems are present at the facility (one at the flow equalization system, one at the secondary system, and one at the sludge dewatering building). Land application of sludge began in early 1998, when the on-site incinerator was eliminated. Section 11 of this fact sheet discusses sludge treatment and disposal methods in detail.

a) **Preliminary Treatment**
Four interceptors bring sewage to the treatment plant (Potomac, Four Mile Run Gravity, Four Mile Run Gravity Relief, and the Low Level). The Low Level interceptor receives sewage from the Operations Control Building and two car dealerships. This influent is pumped into the head of the Four-Mile Run Gravity interceptor. Influent from the interceptors flows to an influent channel and then to the Preliminary Treatment Building where it is mechanically screened and degritted using three barscreens and four 30-mgd grit chambers. If the flow from the primary clarifiers to secondary treatment exceeds the maximum amount allowable, influent is pumped from the primary effluent channel to a 4.9 mg equalization tank. When the flow rates drop, partially treated wastewater in the equalization tank is discharged to either the primary influent or primary effluent channel. Grit and compacted screenings from the preliminary treatment process and scum from the primary treatment process are taken to the Fairfax County municipal solid waste incinerator in Lorton, Virginia.

b) **Primary Treatment**
Eight parallel primary treatment rectangular tanks serve as primary clarifiers. Four of the tanks are of newer construction and have a capacity of 39,000 ft^3 (0.29 MG). The older tanks are larger with a capacity of 58,000 ft^3 (0.43 MG). All the tanks are not always in use. A BOD removal of 46% and a TSS removal of 70% can be achieved with 4-5 tanks in use. A chain and flight collector mechanism moves the settled material (primary sludge) to the influent end of the tank, and the floating material (grease) to the effluent end of the tank. The

primary sludge is pumped to the gravity thickener for additional dewatering. The grease is concentrated and blended with the grit and screenings for disposal at the Lorton Landfill.

c) **Secondary Treatment**

The secondary treatment system consists of four 2.5-MG parallel pass aeration basins that are configured to operate the activated sludge process in a modified step-feed mode. Fine bubble membrane diffusers, supplied by six blowers, are used to mix and aerate the activated sludge. A defoaming agent is added to control the filamentous growth. All aeration tanks have anoxic fractions for denitrification. The degree of anoxic zone necessary is temperature dependent. Six center-feed circular clarifiers follow this treatment. The waste sludge from this process is pumped to a dissolved air flotation thickener.

d) **Tertiary Treatment**

The advanced treatment processes include phosphorus removal, gravity filtration, disinfection, and dechlorination.

1) Phosphorus Removal. This is a one-stage process that uses three 2.2-MG reaction clarifiers. A 34-38% ferric chloride concentration is added directly to the clarifiers to chemically precipitate phosphorus. Algae in the wiers is controlled by the addition of sodium hypochlorite in the distribution box. Polymer is also available to enhance precipitation and settling, but is not regularly used.

2) Gravity Filtration. Eight multimedia rectangular basins follow the phosphorus removal process. Filtration removes additional solids and phosphorus.

3) Disinfection. A 5% sodium hypochlorite solution is used for disinfection and is currently being added at the advanced wastewater treatment (AWT) wet well or the chlorine contact tanks influent. There are four chlorine contact tanks, each with a capacity of approximately 84,000 ft^3 (0.63 mg). The average retention time in each contact tank is 40 minutes. The chlorine residual is currently maintained at 0.50 mg/1, and the *E. coli* geometric mean in the effluent at Outfall 001 during each month of 2007 was below 126/100 ml.

4) Dechlorination. Sodium bisulfite is added after the chlorine contact tank to neutralize chlorine residual in the wastewater. A splitter box is used to distribute the dose.

5) Sampling. The sampling point for Outfall 001sampling point is immediately after dechlorination.

e) **Bypass Points**

Bypasses at this facility occur at three levels of treatment.

1) Secondary Effluent (AWT Bypass). Bypasses can occur due to hydraulic overload caused by a power failure or AWT breakdown. Treatment consists of, screen and grit removal, primary sedimentation, biological treatment using activated sludge, secondary clarification, and post chlorination.

2) Primary Effluent (Secondary Bypass). Bypasses can occur due to hydraulic overload. Treatment consists of screening, grit removal, primary settling, and chlorination.

3) Raw Effluent (Plant Bypass). Bypasses can occur due to flooding and power failures. Treatment consists of chlorination. No contact time is provided.

TABLE 1 – Outfall Description

Outfall Number	Discharge Sources	Treatment	Design Flow	Outfall Latitude and Longitude
001	Domestic, Commercial, Industrial Wastewater	See Item 10.	30 mgd Design Flow (Future 40 mgd design flow tier)	38° 50' 37.74" N 77° 03' 39.3" W
--	Plant Bypass	See Item 10.	Variable	38° 50' 28.62" N 77° 03' 19.20" W
See **Attachment 3** Alexandria Quadrangle Topographic Map (#204d).				

11. Sludge Treatment and Disposal Methods:

Secondary and tertiary solids are pumped to two dissolved air floatation thickeners (DAF) for dewatering. Primary treatment sludge, DAF overflow, and occasional waste activated sludge (WAS) from the secondary clarifiers is pumped to a gravity thickener unit for dewatering. The combined thickened sludge from the gravity and floatation thickeners is then pumped into two 180,000-gallon holding tanks.

Sludge is transferred from the holding tanks to the sludge dewatering building where a dilute concentration of 0.2-0.5% polymer is mixed with the thickened sludge in three centrifuges. Sludge consisting of approximately 28% cake solids is sent to four sludge cake storage bins within the building. The sludge cake is removed from the storage bins by the sludge conveyance system and combined with lime before discharging to hauling trucks. To reduce pathogens and vector attraction in the dewatered sludge, it is lime stabilized for at least two hours to obtain a pH of 12.0 SU and retained at a pH of at least 11.5 for 24 hours. Odors generated from the dewatering building are controlled with a wet chemical scrubber system. Water generated from the odor control system is sent to the plant influent.

All biosolids are to be land applied on Department of Environmental Quality (DEQ) permitted sites in Virginia by Synagro Mid-Altlantic, Inc. Disposal at the King George Landfill and other approved landfill sites may be used as disposal options change.

12. Discharges and Monitoring Stations in Waterbodies VAN-A12R and VAN-A12E:

TABLE 2 - Discharges, Intakes, Monitoring Stations, Other Items in Discharge Waterbody	
Description	**Latitude/Longitude**
The Nature Conservancy (VA0089796)	38° 52' 57", 77° 06' 47"
WMATA – West Falls Church Metro Rail Yard (VAR051096)	--
WMATA – Metro Arlington Bus Annex (VAR051089)	--
Mid Atlantic Coca Cola – Alexandria (VAR050499)	--
WMATA – Metro Arlington Bus Annex (VAR051089)	--
US Army – Fort Myer Military Community (VAR051421)	--
Burke Recyclable Materials Processing Facility (VAR051626)	--
Virginia Concrete – Shirlington Plant (VAG110087)	38° 50' 00" 77° 05' 00"
Crown VA009 (VAG830147)	--
Ballston Common Associates LP (VAG830101)	--
Columbia Village (VAG830265)	--
Universal Air and Vacuum Service (VAG750155)	--
BP Amoco 84667 (VAG750156)	--
Crystal Plaza 5 (VAG25066)	--
Crystal Plaza 5 (VAG250067)	--
DEQ Ambient Water Quality Monitoring Station 1AF0U001.92 located near the Rt. 120 Bridge on West Glebe Road	38° 50' 37", 77° 04' 39"
Arlington WPCP (VA0025143) Outfall 001	38° 50' 37.74", 77° 03' 39.30"
Arlington WPCP (VA0025143) Bypass	38° 50' 28.62", 77° 03' 19.20"
Arlington County WPCP Storm Water Industrial Permit (VAR051421)	--
Frucon Storm Water Construction Permit (DCR01-07-101112)	--
Alberici Storm Water Construction Permit (DCR01-07-100819)	--
Arlington County WPCP Nutrient Trading Permit (VAN010021)	--
U.S. Department of Defense – Pentagon (VA0032000)	38° 51' 55", (Outfall 001) 77° 02' 46" 38° 52' 07", (Outfall 002) 77° 02' 36.6"
Alexandria Combined Sewer System (VA0087068)	38° 48' 36", (Outfall 001) 77° 02' 49" 38° 47' 30", (Outfall 002) 77° 02' 49" 38° 48' 15", (Outfall 003) 77° 03' 33 38° 48' 13", (Outfall 004) 77° 03' 34
WMATA -- Four Mile Run Metro Bus Garage (VAR51097)	38° 50' 45", 77° 03' 15"
US NPS - George Washington Memorial Pkwy Maintenance (VAR051790)	--
Reagan National Airport (storm water discharge to Washington, D.C. waters approximately one mile below Outfall 001 of the Arlington WPCP)	---
DEQ Ambient Water Quality Monitoring Station 1aFOU000.19 located near the G.W. Parkway Bridge on Four Mile Run, approximately one mile below the Arlington WPCP discharge.	38° 50' 28", 77° 02' 54"

13. Material Storage: Attachment 4 for a summary of all materials and the volumes stored onsite.

14. Site Inspection: DEQ-NRO staff performed a technical and laboratory inspection on December 18-19, 2007. See **Attachment 5** for the Technical Summary. A copy of the full inspection report is included in the 2008 permit reissuance file.

15. Receiving Stream Water Quality and Water Quality Standards:

a) Ambient Water Quality Data

The Arlington WPCP discharges into the tidal portion of Four Mile Run (rivermile 1.46 to 0.00 of Four Mile Run). DEQ monitored Four Mile Run at Station 1aFOU000.19, located approximately one mile below Outfall 001 of the Arlington WPCP from 1974 through June 13, 2006. The nearest monitoring station above Outfall 001 is station 1AFOU001.92, located approximately 0.94 miles above Outfall 001 of the Arlington County WPCP. This is an active monthly ambient monitoring station located in the free-flowing freshwater segment of Four Mile Run. See **Attachment 6,** Planning Statement for the Arlington WPCP**.**

Significant portions of the Chesapeake Bay and its tributaries are listed as impaired on Virginia's 303(d) list of impaired waters for not meeting the aquatic life use support goal, and the 2006 Virginia Water Quality Assessment 305(b)/303(d) Integrated Report indicates that much of the mainstem Bay does not fully support this use support goal under Virginia's Water Quality Assessment guidelines. Nutrient enrichment is cited as one of the primary causes of impairment.

In response, the Virginia General Assembly amended the State Water Control Law in 2005 to include the *Chesapeake Bay Watershed Nutrient Credit Exchange Program*. This statute set forth total nitrogen and total phosphorus discharge restrictions within the bay watershed. Concurrently, the State Water Control Board adopted new water quality criteria for the Chesapeake Bay and its tidal tributaries. These actions necessitate the evaluation and the inclusion of nitrogen and phosphorus limits on discharges within the bay watershed.

b) Receiving Stream Water Quality Criteria

Part IX of 9 VAC 25-260(360-550) designates classes and special standards applicable to defined Virginia river basins and sections. The receiving stream, Four Mile Run, is located within Section 6 of the Potomac River Basin, and is a Class II water.

Class II tidal waters in the Chesapeake Bay and it tidal tributaries must meet dissolved oxygen concentrations as specified in 9 VAC 25-260-185 and maintain a pH of 6.0-9.0 standard units as specified in 9 VAC 25-260-50. In the Northern Virginia area, Class II waters must meet the Migratory Fish Spawning and Nursery Designated Use from February 1 through May 31. For the remainder of the year, these tidal waters must meet the Open Water use. The applicable dissolved oxygen concentrations are presented in **Attachment 7**.

Since the tidal portion of Four Mile Run directly discharges to the Potomac River, the Arlington County WPCP influences the Potomac River . The Outfall 001 discharge is approximately 0.6 miles from the Washington D.C./Virginia border. All effluent limitations established in this permit reissuance will comply with both Commonwealth of Virginia and District of Columbia Water Quality Standards at the convergence of Four Mile Run and the Potomac River.

Attachment 8 details Commonwealth of Virginia Water Quality Criteria applicable to the receiving stream and the District of Columbia Water Quality Standards.

Ammonia:

The freshwater aquatic life water quality criteria for ammonia are dependent on the in-stream temperature and pH. The 90th percentile temperature and pH values are used to calculate ammonia criteria because they best represent the critical design conditions of the receiving stream. Effluent data were used to calculate ammonia criteria in this and the previous permit reissuance because at low tide and during drought conditions, Four Mile Run consists primarily of effluent. Using freshwater water data derived from USGS Gaging Station 01652000 located on Four Mile Run, at a discharge of 40 mgd from Outfall 001 the High Flow 30Q10 will yield an in-

stream waste concentration (IWC) of 96%; the Low Flow 30Q10 will yield an IWC of 98%.

The Arlington WPCP discharges into the tidal freshwater Potomac River and tributaries that enter the tidal freshwater Potomac River from Cockpit Point to the fall line at Chain Bridge. Therefore, ammonia criteria can be established in this permit reissuance for the following three seasons: April through October, November through February, and March. Acute criteria are calculated in the same manner for all seasons, using the assumption that trout are absent. Chronic criteria for April through October and March are calculated with the assumption that early life stages of fish are present. Chronic criteria for November through February are calculated with the assumption that early life stages of fish are absent. Per the Virginia Water Quality Standards, ammonia criteria are calculated using the following formulas:

Acute Criteria (when trout are absent)

$$0.411/(1 + 10^{7.204-pH}) + 5.84/(1 + 10^{pH-7.204})$$

Chronic Criteria (early life stages of fish present)

$$[0.0577/(1+10^{7.688-pH}) + 2.487/(1 + 10^{pH-7.688})]MIN$$

$$MIN = 2.85 \text{ or } 1.45 \times 10^{0.028\,(25-T)}, \text{ whichever is less}$$

T = temperature in ^{o}C

Chronic Criteria (early life stages of fish absent)

$$[0.0577/(1+10^{7.688-pH}) + 2.487/(1 + 10^{pH-7.688})]\ 1.45 \times 10^{0.028\,(25-MAX)}$$

MAX = temperature in ^{o}C or 7, whichever is greater

Since the temperature of the Arlington WPCP effluent in the November through February period is >15^{o} C (the average temperature from January 2002 through December 2007 is 18.7^{o}C), chronic ammonia criteria are the same whether early life stages are present or absent. Therefore, there is no need to establish three seasonal ammonia tiers in this permit. Two ammonia tiers will be present in this permit reissuance (April through October and November through March).

Staff has re-evaluated the effluent data from the period of January 2002 through December 2007 for pH and temperature and finds no statistically significant difference from the data used to establish ammonia criteria and subsequent effluent limits in the previous permit. Therefore, the previously established pH and temperature values will be carried forward as part of this reissuance process. The derivation of the 90th percentile values of the effluent pH and temperature data can be found in the 2008 permit reissuance file. Table 3 below is an illustration of the 90th percentile pH and temperature values and the ammonia criteria.

TABLE 3 – Acute and Chronic Ammonia Criteria

Season	90th Percentile pH (SU)	90th Percentile Temperature (°C)	Acute Ammonia Criteria (mg/l)	Chronic Ammonia Criteria (mg/l)
Apr – Oct (2003 Reissuance)	7.2	28.2	29.5	2.26
Apr – Oct (2008 Reissuance)	7.1	27.6	36.09	2.54
Nov – Mar (2003 Reissuance)	7.1	21.9	32.8	3.50
Nov – Mar (2008 Reissuance)	7.0	21.7	36.09	3.72

Metals Criteria:

The water quality Criteria for some metals are dependent on the receiving stream's hardness (expressed as mg/l calcium carbonate). Again, since the stream is mostly made up of effluent during the critical stream flow conditions, effluent hardness will be used to determine the metals criteria. Staff used effluent hardness data collected during toxics monitoring conducted on August 4, 2004, September 21, 2005, August 2, 2006, and June 21, 2007 to determine an average hardness of 177 mg/L. The hardness-dependent metals criteria

calculated using this hardness value are shown in **Attachment 8** (the Commonwealth of Virginia and the District of Columbia use the same criteria).

Organic Compounds Criteria:
The water quality criteria for organic compounds (non-carcinogens and carcinogens) are based upon the human health criteria. The human health criteria are shown in **Attachment 8**.

Bacteria Criteria: The Virginia Water Quality Standards (9 VAC 25-260-170 B.) states sewage discharges shall be disinfected to achieve the following criteria:

E. coli and enterococci bacteria per 100 ml of water shall not exceed the following:

	Geometric Mean[1]	Single Sample Maximum
Freshwater *E. coli* (N/100 ml)	126	235
Saltwater[and Transition Zone[2]] enterococci	35	

[1]For two or more samples [taken during any calendar month].
[2]See 9 VAC 25-260-140 C for fresh[water] and transition zone delineation

The Arlington WPCP discharge is considered to be in a freshwater discharge area and thus, the discharge will analyze *E. coli* levels. An E. coli monthly average of 126n/100ml should be protective of the District of Columbia Water Quality Standards of 200n/100 ml fecal coliform.

c) Receiving Stream Special Standards
The State Water Control Board's Water Quality Standards, River Basin Section Tables (9 VAC 25-260-360, 370 and 380) designates the river basins, sections, classes, and special standards for surface waters of the Commonwealth of Virginia. The receiving stream, Four Mile Run, is located within Section 6 of the Potomac River Basin. This section has been designated with special standards of b and y.

Special Standard "b" (Potomac Embayment Standards) established effluent standards for all sewage plants discharging into Potomac River embayments and for expansions of existing plants discharging into non-tidal tributaries of these embayments. 9 VAC 25-415, Policy for the Potomac Embayments controls point source discharges of conventional pollutants into the Virginia embayment waters of the Potomac River, and their tributaries, from the fall line at Chain Bridge in Arlington County to the Route 301 Bridge in King George County. The regulation sets effluent limits for BOD_5, total suspended solids, phosphorus, and ammonia, to protect the water quality of these high profile waterbodies.

Special Standard "y" is the chronic ammonia criterion for tidal freshwater Potomac River and tributaries that enter the tidal freshwater Potomac River from Cockpit Point (below Occoquan Bay) to the fall line at Chain Bridge. During November 1 through February 14 of each year the thirty-day average concentration of total ammonia nitrogen (in mg N/L) shall not exceed, more than once every three years on the average the following chronic ammonia criterion:

$$\frac{0.0577}{1 + 10^{7.688\text{-pH}}} \quad \frac{2.487}{1 + 10^{\text{pH-}7.688}} \quad \text{x } 1.45(10^{0.28(25\text{-MAX})})$$

MAX = temperature in °C or 7, whichever is greater.

The default design flow for calculating steady state waste load allocations for this chronic ammonia criterion is the 30Q10, unless statistically valid methods are employed which demonstrate compliance with the duration and return frequency of this water quality criterion.

d) Threatened or Endangered Species

The Virginia DGIF Fish and Wildlife Information System Database was searched for records to determine if there are threatened or endangered species in the vicinity of the discharge: Brook Floater, Wood Turtle, Upland Sandpiper, Loggerhead Shrike, Henslow's Sparrow, Appalachian Grizzled Skipper, Bald Eagle, and Migrant Loggerhead Shrike. The limits proposed in this draft permit are protective of the Virginia Water Quality Standards and therefore, protect the threatened and endangered species found near the discharge.

The stream that the facility discharges to is within a reach identified as having an Anadromous Fish Use. It is staff's best professional judgment that the proposed limits are protective of this use.

16. Antidegradation (9 VAC 25-260-30):

All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

Staff has determined that the receiving waters, the tidal segment of Four Mile Run (rivermile 1.46 - 0.0) are Tier 1 due to the impairments discussed in this section. Tidal Four Mile Run is listed for four impairments for the 2007 Integrated Assessment. Two are for bacteria parameters (*E. coli* and fecal coliform), one for PCBs in fish tissue, and one for insufficient acreage of submerged aquatic vegetation. A bacteriological TMDL is being developed for the discharge segment. The fish tissue in PCBs TMDL for the tidal Potomac River was approved by EPA on October 31, 2007. Permit limits proposed have been established by determining wasteload allocations that will attain and/or maintain all water quality criteria applicable to the receiving stream, including narrative criteria. Hence, these wasteload allocations will provide for the protection and maintenance of all existing uses.

17. Effluent Screening, Wasteload Allocation, and Effluent Limitation Development:

To determine water quality-based effluent limitations for a discharge, the suitability of data must first be determined. Data is suitable for analysis if one or more representative data points is equal to or above the quantification level ("QL") and the data represent the exact pollutant being evaluated.

Next, the appropriate Water Quality Standards (WQS) are determined for the pollutants in the effluent. Then, the Wasteload Allocations (WLAs) are calculated. Since the IWCs will likely exceed 90% at a design flow of 40 mgd, the critical flows of 7Q10, 1Q10, and 30Q10 have been determined to be zero. Therefore, the WLA's are equal to the WQS. The WLA values are then compared with available effluent data to determine the need for effluent limitations. Effluent limitations are needed if the 97th percentile of the daily effluent concentration values is greater than the acute wasteload allocation or if the 97th percentile of the four-day average effluent concentration values is greater than the chronic wasteload allocation. In the case of ammonia evaluations, limits are needed if the 97th percentile of the thirty-day average effluent concentration values is greater than the chronic WLA. Effluent limitations are based on the most limiting WLA, the required sampling frequency, and statistical characteristics of the effluent data.

a) Effluent Screening:

Effluent data obtained from the permit application and the discharge monitoring reports have been reviewed and determined to be suitable for evaluation. June 21, 2007 base neutral acids (BNA) sampling data was determined not be suitable for evaluation because there is an abnormal concentration of phthalate and phenol not observed in other sampling events for these compounds and inappropriate QLs were used to report the data. Metals results from the August 4, 2004 sampling event were determined not be suitable for evaluation

because the sampling method does not comply with 40 CFR 136. Please see **Attachment 9** for a summary of effluent data.

The following pollutants require a wasteload allocation analysis*:* chlorodibromomethane, chloroform, dichlorobromethane, tetrachloroethylene, trichloroethylene, di-2-ethylhexyl phthalate, total recoverable chromium, total recoverable copper, total recoverable nickel, and total recoverable zinc.

b) Wasteload allocations

Staff derived wasteload allocations where parameters are reasonably expected to be present in an effluent discharged (e.g., total residual chlorine where chlorine is used as a means of disinfection) and where effluent data indicate the pollutant is present in the discharge above quantifiable levels. With regard to the Outfall 001 discharge, ammonia as N is likely present since this is a wastewater treatment plant, total residual chlorine may be present since chlorine is used for disinfection, and water quality criteria monitoring indicate chlorodibromomethane, chloroform, dichlorobromethane, tetrachloroethylene, trichloroethylene, di-2-ethylhexyl phthalate, total recoverable chromium, total recoverable copper, total recoverable nickel, and total recoverable zinc are present in the discharge. **Attachment 8** details the criteria and hence, WLA derivations for these pollutants.

Four Mile Run in the Arlington WPCP area is a tidal water body that discharges to the Potomac River. DEQ guidance states that for surface discharges into tidal estuaries or estuarine embayments, the acute wasteload allocation (WLAa) should be set at two times the acute criteria and the chronic (WLAc) and human health (WLAh) wasteload allocations should be set at 50 times the respective criteria. In this case, staff believes that the guidance for establishing acute, chronic, and human health WLAs is not applicable since the discharge from the Arlington WPCP comprises most of the waterbody during low flow periods. Until dilution is demonstrated through a site-specific study, water quality criteria will apply at the point of discharge

Attachment 8 details the WLA derivations for these pollutants.

c) Effluent Limitations Toxic Pollutants, Outfall 001

9 VAC 25-31-220.D. requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an in-stream excursion of water quality criteria. Those parameters with WLAs that are near effluent concentrations are evaluated for limits.

The VPDES Permit Regulation at 9 VAC 25-31-230.D. requires that monthly and weekly average limitations be imposed for continuous discharges from POTWs and monthly average and daily maximum limitations be imposed for all other continuous non-POTW discharges.

1) Ammonia as N:

Staff evaluated pH and temperature values in the effluent data from January 2002 through December 2007 and has concluded it is not significantly different than what was used to derive the existing ammonia limits. Therefore, the existing ammonia limitations of 1.0 mg/L monthly average and 2.7 mg/L weekly average (April – October) and 3.5 mg/L monthly average and 4.2 mg/L weekly average (November – March) are proposed to continue in the reissued permit. The mass limits for ammonia have been removed from the permit.

2) Total Residual Chlorine:

Chlorine is used for disinfection and is potentially in the discharge. In accordance with current DEQ guidance, staff derived TRC limits using a default data point of 0.2 mg/L and the calculated WLAs. Per DEQ guidance, numeric limits for total residual chlorine (TRC) must be imposed in the permit even where limits are less than the detection level of 0.1 mg/L. A monthly average of 0.008 mg/L and a weekly average limit of 0.010 mg/L are proposed for this discharge.

3) Metals/Organics:

Evaluation of all data provided with the permit application shows that metals limits are not needed in this permit. However, four additional copper samples collected in June and July 2008 drove the determination that total recoverable copper limits were not needed. It is the best professional judgment

of staff that quarterly monitoring for total recoverable copper be conducted during the first two years of this permit reissuance to ensure copper levels are consistently below a level where a limit would be needed. See **Attachment 10** for derivation of the limits.

Tetrachloroethylene was found to be present in a level above the human health criteria in one sampling event out of seven total. The remaining sampling events showed tetrachloroethylene to be below detection limits. Therefore, tetracholoroethylene will be monitored quarterly during the first two years of this permit cycle.

If all quarterly monitoring results show that these parameters are below detectable levels, DEQ-NRO staff may reduce the frequency of monitoring for tetrachloroethylene and total recoverable copper to a semiannual basis.

This permit has a reopener clause that will allow a copper limit to be added if data shows that a limit is needed. Additionally, if tetrachloroethylene is found to be consistently present above the human health criteria, the permit may be reopened to include a tetrachloroethylene limit

4) Effluent Limitations Policy for the Potomac River Embayments:
The Potomac Embayment Standards (PES) include monthly average effluent limits that apply to all sewage treatment plants. The Policy for the Potomac River Embayments states in part that "the above limitations shall not replace or exclude the discharge from meeting the requirements of the State's Water Quality Standards (9 VAC 25-260-10 et seq.)." Section 27 of this fact sheet discusses this policy in detail. Table 4 below outlines the PES limits.

TABLE 4 – Policy for the Potomac River Embayment Limitations

Parameter	Monthly Average (mg/l)
$cBOD_5$	5
Total Suspended Solids	6
Total Phosphorus	0.18
NH_3 (Apr 1 – Oct 31)	1

d) Effluent Limitations and Monitoring, Outfall 001 – Conventional and Non-Conventional Pollutants
No changes to dissolved oxygen (D.O.), biochemical oxygen demand-5 day (BOD_5), total suspended solids (TSS), total kjeldahl nitrogen (TKN), and pH limitations are proposed. Monitoring for orthophosphorus has been removed from this permit.

e) Effluent Annual Average Limitations and Monitoring, Outfall 001 – Nutrients
VPDES Regulation 9 VAC 25-31-220(D) requires effluent limitations that are protective of both the numerical and narrative water quality standards for state waters, including the Chesapeake Bay.

As discussed in Section 15, significant portions of the Chesapeake Bay and its tributaries are listed as impaired with nutrient enrichment cited as one of the primary causes. Virginia has committed to protecting and restoring the Bay and its tributaries.

The State Water Control Board adopted new Water Quality Criteria for the Chesapeake Bay in March 2005. In addition to the Water Quality Standards, there are three new regulations that necessitate nutrient limitations:

- 9 VAC 25-40 - *Regulation for Nutrient Enriched Waters and Dischargers within the Chesapeake Bay Watershed* requires discharges with design flows of ≥0.04 mgd to treat for TN and TP to either BNR levels (TN = 8 mg/L; TP = 1.0 mg/L) or SOA levels (TN = 3.0 mg/L and TP = 0.3 mg/L).

- 9 VAC 25-720 – *Water Quality Management Plan Regulation* sets forth TN and TP maximum wasteload allocations for facilities with design flows of ≥0.5 mgd limiting the mass loading from these discharges. The Water Quality Management Planning Regulation provides the following nutrient WLAs for this facility in Section C: 365,467 lbs/yr for total nitrogen and 21,928 lbs/yr for total phosphorus.

- 9 VAC 25-820 *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia* was approved by the State Water Control Board on September 6, 2006 and became effective January 1, 2007. This regulation specifies and controls the nitrogen and phosphorus loadings from facilities and specifies facilities that must register under the general permit. Nutrient loadings for those facilities registered under the general permit as well as compliance schedules and other permit requirements, shall be authorized, monitored, limited, and otherwise regulated under the general permit and not this individual permit.

9 VAC 25-40-70, *Regulation for Nutrient Enriched Waters and Dischargers within the Chesapeake Bay Watershed*, states that the board shall include technology-based effluent concentration limitations in the individual permit for any facility that has installed technology for the control of nitrogen and phosphorus. 9 VAC 25-40-70 also states that the limitations shall be based upon the technology installed by the facility and shall be expressed as annual average concentrations.

Monitoring for Nitrates + Nitrites, Total Kjeldahl Nitrogen, Total Nitrogen, and Total Phosphorus are included in this permit to protect the Water Quality Standards of the Chesapeake Bay. Monitoring frequencies are set at the frequencies set forth in 9 VAC 25-820 except for Total Phosphorus which is more frequent.

DEQ Grant Number 440-S-98-08 establishes a BNR concentration for Total Nitrogen of 8.0 mg/L at the current design flow of 30 mgd. When the Certificate to Operate is issued for the 40 mgd sewage treatment plant, DEQ Grant Number 440-S-07-10 allows for a Total Nitrogen concentration of 3.0 mg/L and a Total Phosphorus Concentration of 0.18 mg/L. Therefore, a concentration limit of 8.0 mg/L Total Nitrogen annual average shall be placed into the individual permit at the 30 mgd design flow and a concentration limit of 3.0 mg/L Total Nitrogen annual average shall be placed into the individual permit at the 40 mgd design flow based on 9 VAC 25-40-70. Monthly and year to date calculations for Total Nitrogen are also included in this individual permit. Loading limits will be governed by the general permit mentioned above. The annual average for Total Phosphorus was not included in this individual permit since the monthly average is more stringent than an annual average of the same concentration.

f) Effluent Limitations and Monitoring Summary.

The effluent limitations are presented in the tables that follow. Limits have been established for flow, $cBOD_5$, TSS, ammonia, pH, D.O., Total Phosphorus, Total Nitrogen, *E. coli,* and copper. Monitoring is included for Nitrates + Nitrites, TKN, and tetrachloroethylene.

1) $cBOD_5$, TSS, phosphorus, and ammonia (April -- October) limits are based on the Policy for Potomac River Embayments (9 VAC 25-415-10 et seq.).

2) The limits for ammonia (November – March and April – October weekly average) and *E. coli* are based on the Virginia Water Quality Standards (9 VAC 25-260-170).

3) The limits for pH are based on based on the Water Quality Standards for the District of Columbia.

4) The limits for TRC and total recoverable copper are based on both the Virginia Water Quality Standards (9 VAC 25-260-170) and the Water Quality Standards for the District of Columbia (**Attachment 8**).

5) The limits for D.O. are based on 1988 modeling by the Northern Virginia Planning District Commission

(NVPDC) conducted in conjunction with the Policy for the Potomac Embayments.

The mass loading (kg/d) for monthly and weekly averages were calculated by multiplying the concentration values (mg/l), with the flow values (in mgd) and a conversion factor of 3.785.

The mass loading (lb/d) for Total Phosphorus monthly and weekly averages were calculated by multiplying the concentration values (mg/l), with the flow values (in mgd) and a conversion factor of 8.3438.

Sample Type and Frequency are in accordance with the recommendations in the VPDES Permit Manual and 9 VAC 25-820-70.E.1 (General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia, Monitoring Requirements).

18. Antibacksliding:

All limits in this permit are at least as stringent as those previously established. Backsliding does not apply to this reissuance.

19.a Effluent Limitations/Monitoring Requirements:

Design flow is 30 mgd.

Effective Dates: During the period beginning with the permit's effective date and lasting until the CTO is issued for the 40 mgd facility or the permit expiration date, whichever comes first.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (mgd)	NA	NL	NA	NA	NL	Continuous	TIRE
pH	1	NA	NA	6.0 S.U.	8.5 S.U.	1/D	Grab
$CBOD_5$	2	5 mg/L 600 kg/day	8 mg/L 900 kg/day	NA	NA	1/D	24H-C
Total Suspended Solids (TSS)	2	6.0 mg/L 680 kg/day	9.0 mg/L 1000 kg/day	NA	NA	1/D	24H-C
D.O.	1, 3, 4	NA	NA	6.0 mg/L	NA	1/D	Grab
Total Kjeldahl Nitrogen (TKN)	3,5	NL	NL	NA	NA	3D/W	24H-C
Ammonia, as N (Apr - Oct)	2	1.0 mg/l 110 kg/day	2.7 mg/l 310 kg/day	NA	NA	1/D	24H-C
Ammonia, as N (Nov - Mar)	1, 3	3.5 mg/L	4.2 mg/L	NA	NA	1/D	24H-C
E. coli (Geometric Mean)	1, 3	126 n/100mls	NA	NA	NA	5D/W	Grab
Total Residual Chlorine (after contact tank) [a]	6	NA	NA	0.5 mg/L	NA	1/2H	Grab
Total Residual Chlorine (after dechlorination)	1, 3	0.008 mg/L	0.01 mg/L	NA	NA	1/D	Grab
Nitrate+Nitrite, as N	5	NL	NA	NA	NA	3D/W	24H-C
Total Nitrogen [b.]	3, 5	NL mg/L	NA	NA	NA	3D/W	Calculated
Total Nitrogen – Year to Date [c]	3, 5	NL	NA	NA	NA	1/M	Calculated
Total Nitrogen - Calendar Year [c]	3, 5	8.0 mg/L	NA	NA	NA	1/Y	Calculated
Total Phosphorus	2, 3	0.18 mg/L 45 lb/day	0.27 mg/L 67 lb/day	NA	NA	1/D	24H-C
Total Recoverable Copper	1, 3	NL	NL	NA	NA	1/3M[d]	Grab
Tetrachloroethylene	1, 3	NL	NL	NA	NA	1/3M[d]	Grab
Chronic Toxicity – *C. dubia* (TU_c)	NA	NA	NA	NA	NL	1/Y	24H-C
Chronic Toxicity – *P. promelas* (TU_c)	NA	NA	NA	NA	NL	1/Y	24H-C

The basis for the limitations codes are:

1. Washington D.C. WQS
2. Policy for the Potomac River Embayments (9 VAC 25-425-10 et seq.)
3. VA WQS
4. NVPDC Modeling
5. 9 VAC 25-40-70 (Water Quality Mgmt. Plan)
6. Disinfection Design Requirements

mgd = Million gallons per day.
N/A = Not applicable.
NL = No limit; monitor and report.
TIRE = Totalizing, indicating and recording equipment.
S.U. = Standard units.

1/D = Once every day.
3D/W = Three days per week.
5D/W = Five days a week.
1/2H = Once every two hours.
1/M = Once every month.
1/Y = Once every year.
1/3M = Once every three months.

24H-C = A flow proportional composite sample collected manually or automatically and discretely or continuously for the entire discharge of the monitored 24-hour period. Where discrete sampling is employed, the permittee shall collect a minimum of twenty-four (24) aliquots for compositing. Discrete sampling may be flow proportioned either by varying the time interval between each aliquot or the volume of each aliquot. Time composite samples consisting of a minimum of twenty-four (24) grab samples obtained at hourly or smaller intervals may be collected where the permittee demonstrates that the discharge flow rate (gallons per minute) does not vary by 10% or more during the monitored discharge.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.

a. See Part 1.B.1 of the permit for limitations and monitoring information.

b. Total Nitrogen = Sum of TKN plus Nitrate+Nitrite

c. See Part 1.B.4. of the permit for nutrient reporting calculations.

d. Sampling shall be conducted during the calendar quarters (Jan - Mar, Apr - Jun, Jul - Sep, Oct - Nov). The results of quarterly sampling shall be received by DEQ-NRO with the DMR on April 10, July 10, October 10, and January 10. If all results within a two-year period are below detection levels, the monitoring frequency may be reduced to semiannually for the remainder of the permit cycle. The semiannual monitoring periods shall be January through June and July through December. The DMR shall be submitted no later than the 10th day of the month following the monitoring period.

19.b Effluent Limitations/Monitoring Requirements:

Design flow is 40 mgd.

Effective Dates: During the period beginning with the issuance of the CTO for the 40 mgd facility and lasting until the permit expiration date.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (mgd)	NA	NL	NA	NA	NL	Continuous	TIRE
pH	1	NA	NA	6.0 S.U.	8.5 S.U.	1/D	Grab
$CBOD_5$	2	5 mg/L 800 kg/day	8 mg/L 1000 kg/day	NA	NA	1/D	24H-C
Total Suspended Solids (TSS)	2	6.0 mg/L 910 kg/day	9.0 mg/L 1400 kg/day	NA	NA	1/D	24H-C
D.O.	1, 3, 4	NA	NA	6.0 mg/L	NA	1/D	Grab
Total Kjeldahl Nitrogen (TKN)	3,5	NL	NL	NA	NA	3D/W	24H-C
Ammonia, as N (Apr - Oct)	2	1.0 mg/l 150 kg/day	2.7 mg/l 410 kg/day	NA	NA	1/D	24H-C
Ammonia, as N (Nov - Mar)	1, 3	3.5 mg/L	4.2 mg/L	NA	NA	1/D	24H-C
E. coli (Geometric Mean)	1, 3	126 n/100mls	NA	NA	NA	5D/W	Grab
Total Residual Chlorine [a] (after contact tank)	6	NA	NA	0.5 mg/L	NA	1/2H	Grab
Total Residual Chlorine (after dechlorination)	1, 3	0.008 mg/L	0.01 mg/L	NA	NA	1/D	Grab
Nitrate+Nitrite, as N	5	NL	NA	NA	NA	3D/W	24H-C
Total Nitrogen [b.]	3, 5	NL mg/L	NA	NA	NA	3DW	Calculated
Total Nitrogen – Year to Date [c.]	3, 5	NL	NA	NA	NA	1/M	Calculated
Total Nitrogen - Calendar Year [bc]	3, 5	3.0 mg/L	NA	NA	NA	1/Y	Calculated
Total Phosphorus	2, 3	0.18 mg/L 60 lb/day	0.27 mg/L 90 lb/day	NA	NA	1/D	24H-C
Total Recoverable Copper	1, 3	NL	NL	NA	NA	1/3M[d]	Grab
Tetrachloroethylene	1, 3	NL	NL	NA	NA	1/3M[d]	Grab
Chronic Toxicity – *C. dubia* (TU_c)	NA	NA	NA	NA	NL	1/Y	24H-C
Chronic Toxicity – *P. promelas* (TU_c)	NA	NA	NA	NA	NL	1/Y	24H-C

The basis for the limitations codes are:

1. Washington D.C. WQS
2. Policy for the Potomac River Embayments (9 VAC 25-425-10 et seq.)
3. VA WQS
4. NVPDC Modeling
5. 9 VAC 25-40-70 and 9 VAC 820-10 (Nutrient Regulations)
6. Disinfection Design Requirements

mgd=Million gallons per day.
N/A=Not applicable.
NL=No limit; monitor and report.
TIRE=Totalizing, indicating and recording equipment.
S.U.=Standard units.

1/D = Once every day.
3D/W = Three days per week.
5D/W = Five days a week.
1/2H = Once every two hours.
1/M = Once every month.
1/Y = Once every year.
1/3M = Once every three months.

24H-C = A flow proportional composite sample collected manually or automatically and discretely or continuously for the entire discharge of the monitored 24-hour period. Where discrete sampling is employed, the permittee shall collect a minimum of twenty-four (24) aliquots for compositing. Discrete sampling may be flow proportioned either by varying the time interval between each aliquot or the volume of each aliquot. Time composite samples consisting of a minimum of twenty-four (24) grab samples obtained at hourly or smaller intervals may be collected where the permittee demonstrates that the discharge flow rate (gallons per minute) does not vary by 10% or more during the monitored discharge.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.

a. See Part 1.B.1 of the permit for limitations and monitoring information.

b. Total Nitrogen = Sum of TKN plus Nitrate+Nitrite

c. See Part 1.B.4. for nutrient reporting calculations

d. Sampling shall be conducted during the calendar quarters (Jan - Mar, Apr - Jun, Jul - Sep, Oct - Nov). The results of quarterly sampling shall be received by DEQ-NRO with the DMR on April 10, July 10, October 10, and January 10. If all results within a two-year period are below detection levels, the monitoring frequency may be reduced to semiannually for the remainder of the permit cycle. The semiannual monitoring periods shall be January through June and July through December. The DMR shall be submitted no later than the 10th day of the month following the monitoring period.

20. Other Permit Requirements:

a) Part I.B. of the permit contains additional chlorine monitoring requirements, quantification levels and compliance reporting instructions.
The DEQ Disinfection Guidelines and Requirements state that a minimum chlorine residual of 0.6 mg/L must be maintained at the exit of the chlorine contact tank and no more than 10% of the monthly test results for TRC at the exit of the chlorine contact tank shall be <1.0 mg/L.

However, variance from these requirements is allowed where the discharger provides adequate indicator microorganism test results for the effluent that verify disinfection standards were met during the TRC violations. The Arlington WPCP has been allowed a minimum chlorine contact value of 0.5 mg/l since fecal coliform values have demonstrated that disinfection standards were met. The Arlington WPCP will be allowed to continue maintenance of a 0.5 mg/l chlorine residual (with no allowable excursions) in the chlorine contact tank, if bacteriological sampling shows the monthly average (calculated using a geometric mean) for *E. coli* to be less than or equal to 126/100 ml. If more than three violations of the monthly average for *E. coli* occur during this permit cycle or the results of the Chlorine Reduction Study for the 40 MGD design flow tier show that inadequate disinfection is occurring, the minimum chlorine residual allowed in the chlorine contact tank will be changed to coincide with the DEQ Disinfection Guidelines and Requirements described in Part I.B.1 of the permit.

9 VAC 25-31-190.L.4.c requires an arithmetic mean for measurement averaging and 9 VAC 25-31-220.D. requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an in-stream excursion of water quality criteria. Specific analytical methodologies for toxics are listed in this permit section as well as quantification levels (QLs) necessary to demonstrate compliance with applicable permit limitations or for use in future evaluations to determine if the pollutant has reasonable potential to cause or contribute to a violation. Required averaging methodologies are also specified.

The calculations for the Nitrogen and Phosphorus parameters shall be in accordance with the calculations set forth in 9 VAC 25-820 *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia*. §62.1-44.19:13 of the Code of Virginia defines how annual nutrient loads are to be calculated; this is carried forward in 9 VAC 25-820-70. As annual concentrations are limited in the individual permit, these reporting calculations are intended to reconcile the reporting calculations between the permit programs. The permittee is collecting a single set of samples for the purpose of ascertaining compliance with both this individual permit and the aforementioned general permit.

b) Permit Section Part I.C., details the requirements of a Pretreatment Program.
The VPDES Permit Regulation at 9 VAC 25-31-210 requires monitoring and 9 VAC 25-31-220.D. requires all discharges to protect water quality. The VPDES Permit Regulation at 9 VAC 25-31-730 through 900 and 40 CFR Part 403 require that POTWs with a design flow of >5 mgd and receiving pollutants from Industrial Users (IUs) which pass through or interfere with the operation of the POTW or are otherwise subject to pretreatment standards to develop a pretreatment program.

This treatment works is a POTW with a design capacity of 30 mgd and a proposed expansion to 40 mgd. The Pretreatment Program was originally approved on February 15, 1984, with subsequent substantial modifications shown in Table 5 below:

TABLE 5 – Modifications to the Pretreatment Program	
Modification Date	**Modification**
February 23, 1994	Revision of the legal authority/ordinance for Arlington County and adoption of technically-based local limits and a permit boilerplate.
January 11, 1995	Incorporation of interjurisdictional agreements with contributors (Alexandria Sanitation Authority and Fairfax County) along with associated ordinance revisions and the adoption of an Enforcement Response Plan.
November 11, 1995	Revision of the county's legal authority to resolve inconsistencies between the ordinance and the program, adjustment of the existing fee schedule for pretreatment dischargers, and adoption of a nonsubstantial program modification that reorganized wastewater permits into two classes--Group 1 and 2 SIUs (Significant Industrial Users).
June 6, 2000	Revision of local limits that were calculated using current influent, effluent, and sludge monitoring data and changes to the wastewater treatment process.

All SIUs in Arlington County are non-categorical. SIU classification is based upon a process flow >25,000 gallons per day or those facilities that have the potential to impact the POTW. Table 6 below lists the SIUs currently discharging to the Arlington WPCP.

TABLE 6 – Significant Industrial Users that Discharge to the Arlington WPCP			
Facility	**Permit No.**	**Effective Date**	**Expiration Date**
Virginia Hospital Center	0995.1	10/01/2007	09/30/2010
Reagan Washington National Airport	0788.2	01/01/2005	12/31/2008
Mid-Atlantic Coca Cola Bottling Plant	Permit No. 12-08-005, issued by the Alexandria Sanitation Authority.	01/01/03	12/31/08

c) Permit Section Part I.D., details the requirements for Toxics Management Program.
The VPDES Permit Regulation at 9 VAC 25-31-210 requires monitoring and 9 VAC 25-31-220.I, requires limitations in the permit to provide for and assure compliance with all applicable requirements of the State Water Control Law and the Clean Water Act. A TMP is imposed for municipal facilities with a design rate >1.0 mgd, with an approved pretreatment program or required to develop a pretreatment program, or those determined by the Board to need a program based on effluent variability, compliance history, IWC, and receiving stream characteristics. The Arlington WPCP meets two of the criteria for a TMP: 1) it is a Publicly Owned Treatment Works (POTW) with a design flow > 1.0 MGD, and 2) it is a POTW with a pretreatment program.

During the previous permit cycle, the permittee conducted annual chronic tests using both *Ceriodaphnia dubia* and *Pimephales promela*s. All TMP testing conducted between March 2006 and October 2007 using Arlington County WPCP effluent indicated an LC_{50} greater than 100% effluent and a NOEC equal to the IWC. A TMP test for *Ceriodaphnia dubia* on May 17, 2005 indicated yielded a TU_c result of 4. Since the testing from March 2006 through October 2007 has passed all decision criteria, the permittee will continue to monitor chronic toxicity annually during the term of this permit reissuance using *Ceriodaphnia dubia* and *Pimephales promelas*. If the effluent is found to be toxic, a toxicity reduction evaluation (TRE) will be required and a whole effluent toxicity (WET) limit will be imposed unless the TRE has successfully identified the chemical(s) causing the toxicity. In that case, a chemical specific limit will be used in lieu of the WET limit. Sampling and reporting procedures are outlined in Part I.E of the permit.

The discharge area for Outfall 001 has tidal influence and is effluent dominated. Dilution will not be used in this permit to determine the WLAc for toxic parameters and the NOEC criteria for toxicity monitoring (**Attachment 11**).

d) Permit Section Part 1.E. details requirements of the Sewage Sludge Management Plan, Sludge Monitoring and Additional Reporting Requirements

1) Regulations:

The VPDES Permit Regulation (VAC 25-31-10 et seq.) has incorporated technical standards for the use or disposal of sewage sludge, specifically land application and surface disposal, promulgated under 40 CFR Part 503. The Permit Regulation (9 VAC 25-31-420) also establishes the standards for the use or disposal of sewage sludge. This part establishes standards that consist of general requirements, pollutant limits, management practices, and operational standards for the final use or disposal of sewage sludge generated during the treatment of domestic sewage in the treatment works.

2) Evaluations:

a. Sludge Classification:
The Arlington WPCP is considered as Class I sludge management facility. The permit regulation (9 VAC 25-31-500) defines a Class I sludge management facility as any POTW required to have an approved pretreatment program defined under Part VII of the VPDES Permit Regulation (9 VAC 25-31-730 to 900) and/or any treatment works treating domestic sewage sludge that has been classified as a Class I facility by the Board because of the potential for its sewage sludge use or disposal practice to adversely affect public health and the environment.

b. Sludge Pollutant Concentration:
The average pollutant concentrations from sewage sludge analyses provided as part of the Arlington WPCP application for the permit reissuance are presented in Table 7. The analysis results are the average from nine samples collected in 2007.

TABLE 7 – Sludge Pollutant Concentrations

Pollutant	Average Concentration (mg/kg dry weight)	Sample Type
Arsenic	1.9	Composite
Cadmium	1.4	Composite
Copper	152	Composite
Lead	32	Composite
Mercury	0.34	Composite
Molybdenum	17	Composite
Nickel	11	Composite
Selenium	5.5	Composite
Zinc	358	Composite

All sewage sludge applied to the land must meet the ceiling concentration for pollutants listed in Table 8. Sewage sludge applied to the land must also meet either pollutant concentration limits, cumulative pollutant loading rate limits, or annual pollutant loading rate limits also listed in Table 8.

Cumulative pollutant loading limits or annual pollutant loading limits may be applied to sewage sludge exceeding pollutant concentration limits but meeting the ceiling concentrations, depending upon the levels of treatment achieved and the form (bulk or bag) of sludge applied. It should be noted that ceiling concentration limits are instantaneous values and pollutant concentration limits are monthly average values. Calculations of cumulative pollutant loading should be based on the monthly average values and the annual whole sludge application rate.

TABLE 8 – Sewage Sludge Pollutant Limits				
Pollutant	**Ceiling Concentration Limits for All Sewage Sludge Applied to Land (mg/kg)***	**Pollutant Concentration Limits for EQ and PC Sewage Sludge (mg/kg)***	**Cumulative Pollutant Loading Rate Limits for CPLR Sewage Sludge (kg/hectare)**	**Annual Pollutant Rate Limits for APLR Sewage Sludge (kg/hectare/356 day period)****
Arsenic	75	41	41	2.0
Cadmium	85	39	39	1.9
Copper	4,300	1,500	1,500	75
Lead	840	300	300	15
Mercury	57	17	17	0.85
Molybdenum	75	---	---	---
Nickel	420	420	420	21
Selenium	100	100	100	5.0
Zinc	7,500	2,800	2,800	140
Applies to:	All sewage sludge that is land applied	Bulk sewage sludge and bagged sewage sludge	Bulk sewage sludge	Bagged sewage
From VPDES Permit Reg. Part VI	Table 1, 9 VAC 25-31-540	Table 3, 9 VAC 25-31-540	Table 2, 9 VAC 25-31-540	Table 4, 9 VAC 25-31-540

*Dry-weight basis
**Bagged sewage sludge is sold or given away in a bag or other container.

Comparing data from Table 7 with Table 8 shows that metal concentrations are significantly below the ceiling and PC concentration requirements.

3) Options for Meeting Land Application:
There are four equally safe options for meeting land application requirements. The options include the Exceptional Quality (EQ) option, the Pollutant Concentration (PC) option, the Cumulative Pollutant Loading Rate (CPLR) option, and the Annual Pollutant Loading Rate (APLR) option.

Pollutant Concentration (PC) is the type of sludge that may only be applied in bulk and is subject to general requirements and management practices. However, tracking of pollutant loadings to the land is not required. The sludge from the Arlington County WPCP is considered PC sewage sludge for the following reasons:

a. The bulk sewage sludge from the Arlington WPCP meets the PC limits in Table 1 of VPDES Permit Regulation Part VI, 9 VAC 25-31-540.

b. The VPDES Permit Regulation, Part VI, Subpart D, (9 VAC 25-31-690 through 720) establishes the requirements for pathogen reduction in sewage sludge. The Arlington WPCP is considered to produce a Class B sludge in accordance with 9 VAC 25-31-710.B.2 (Class B -Alternative 2). Alternative 2 defines Class B sludge as sewage sludge that is used or disposed that has been treated in a process that is equivalent to a Process to Significantly Reduce Pathogens (PSRP) as described in 9 VAC 25-31-710.D.

The Arlington County WPCP treats sludge using a lime stabilization process to reduce pathogens in accordance with the requirements of 9 VAC 25-31-710.D.5.

c. The VPDES Permit Regulation, Part VI, Subpart D, (9 VAC 25-31-690 through 720) also establishes the requirements for Vector Attraction Reduction in sewage sludge. Based on the information supplied with the VPDES Sludge Application, the Arlington County WPCP meets the requirements for Vector Attraction Reduction as defined by 9 VAC 25-31-720.B.6: Lime stabilization is used to raise the pH to 12 or higher for 2 hours and then at 11.5 or higher for 22 hours.

4) Parameters to be Monitored:
In order to assure the sludge quality, the following parameters require monitoring: Arsenic, Cadmium,

Copper, Lead, Mercury, Molybdenum, Nickel, Selenium, and Zinc.

In order to ensure that proper nutrient management and pH management practices are employed, the following parameters are must be monitored: pH, Total Kjeldahl Nitrogen, Ammonia Nitrogen, Nitrate Nitrogen, Total Phosphorus, Total Potassium, and Alkalinity (lime treated sludge should be analyzed for percent calcium carbonate equivalence). The nutrient and pH monitoring requirements apply only if the permittee land applies their own sludge. Since the Arlington County WPCP has contracted biosolids land application responsibilities to Synagro Mid-Altlantic, Inc., they are not required to monitor for nutrients, pH, Total Potassium and Alkalinity.

Soil monitoring in conjunction with soil productivity information is critical (especially for frequent applications) to making sound biosolids application decisions from both an environmental and an agronomic standpoint. Since the Arlington County WPCP has contracted the land application responsibilities to Synagro Mid-Altlantic, Inc., they are not required to perform soil monitoring.

5) Monitoring Frequency:
The total dry metric tons of sludge generated at the Arlington WPCP are 11,100 tons per 365-day period. Therefore, the recommended monitoring frequency for sludge to be land applied is once per every two months (6 times per year) for facilities that produce equal to or greater than 1,500 but less than 15,000 metric tons per 365 days. However, because the Arlington WPCP has monitored sludge for the parameters in Table11 since October 1999, the monitoring frequency can be reduced to annual. If the results of sludge monitoring for any limited pollutant is greater than 75% of the monthly average concentration limitation in Table 13, the monitoring frequency shall be increased to once per every two months for a period of two years. After two years of sampling, DEQ will reevaluate the analytical results at the request of the permittee, and reduce the monitoring requirement if it is deemed appropriate. Fecal coliform bacteria or *Salmonella* shall be monitored every five years or as needed to ensure adequate pathogen reduction.

The Arlington WPCP is required to provide the results of all monitoring performed in accordance with Part I.A and information on management practices and appropriate certifications no later than February 19th of each year (as required by the 503 regulations) to the Northern Regional Office of the Department of Environmental Quality. Each report must document the previous calendar year's activities.

6) Sampling:
Representative sampling is an important aspect of monitoring. Because the pollutant limits pertain to the quality of the final sewage sludge applied to the land, samples must be collected after the last treatment process prior to land application. Composite samples should be required for all samplings from this facility.

7) Sludge Management Plan (SMP):
The SMP is required to be part of the VPDES permit application. The VPDES Sewage Sludge Permit Application Form and its attachments will constitute the applicant's SMP. Any proposed sewage treatment works treating domestic sewage must submit a SMP with the appropriate VPDES permit application forms at least 180 days prior to the date proposed for commencing operations. The permittee shall conduct all sewage sludge use or disposal activities in accordance with the SMP approved with the reissuance of this permit. Any proposed changes in the sewage sludge use or disposal practices or procedures followed by the permittee shall be documented and submitted for Virginia Department of Environmental Quality for review and approval no less than 90 days prior to the effective date of the changes.

Upon approval, the SMP becomes an enforceable part of the permit. The permit may be modified or alternatively revoked and reissued to incorporate limitations/conditions necessitated by substantial changes in sewage sludge use or disposal practices.

The Arlington County WPCP has submitted the VPDES Sewage Sludge Permit Application Form and its attachments. Their SMP dated April 15, 2008 is on file at the Northern Regional Office of the Department of Environmental Quality.

8) Reporting Requirements:
The reporting requirements are for POTWs with a design flow rate equal to or greater than 1.0 mgd (majors), POTWs that serve a population of 10,000 or greater, and Class I sludge management facilities. A permit special condition, which requires these generators to submit an annual report on February 19th of each year, is included. The Arlington County WPCP shall use the Discharge Monitoring Report (DMR) forms as part of the annual report. A sample form (SP1 and S01) with proper DMR parameter codes and its instructions are provided. In addition to the DMR forms, the generators who land apply sewage sludge are responsible for submitting the additional information required by 9 VAC 25-31-590 (*i.e.*, appropriate certification statements, descriptions of how pathogen and vector attraction reduction requirements are met, descriptions of how the management practices are being met, and descriptions of how site restrictions are being met).

9) Records Keeping:
This special condition outlines record retention requirements for sludge meeting Class B pathogen reduction and vector attraction reduction alternative 1-10. Table 9 presents the record keeping requirements.

TABLE 9: Record Keeping for PC Sludge	
1	Pollutant concentrations of each pollutant in Part I.A.3. of the permit;
2	Description of how the pathogen reduction requirement in Part I.A.3. of the permit are met;
3	Description of how the vector attraction requirements in Part I.A.3. of the permit are met;
4	Description of how the management practice specified in the approved Sludge Management Plan and/or the permit are met;
5	Description of how the site restriction specified in the Sludge Management Plan and/or the permit are met;
6	Certification statement in Part I.E.3.b.6) of the permit.

TABLE 10 -- Sewage Sludge Annual Production Monitoring

Effective Dates: During the period beginning with the permit's effective date and lasting until the permit's expiration date, the permittee is authorized to manage sewage sludge according to the approved Sludge Management Plan (SMP). The pollutants in sewage sludge and land application sites shall be limited and monitored by the permittee as specified on form SP1 in accordance with Part I.A.3 of the permit.

MONITORING/RECORDING REQUIREMENT	BASIS FOR LIMITS	FREQUENCY	METHOD OF ANALYSIS
Annual Sludge Production (Metric Tons per Year)	1,2	Once/Year	Measured/Calculated
Annual Sludge Land Applied (Metric Tons per Year)	1,2	Once/Year	Measured/Calculated

The basis for the limits codes are:
1. 9 VAC 25-31-10
2. 40 CFR Part 503

TABLE 11-- Sewage Sludge Chemical Limitations And Monitoring Requirements

Effective Dates: During the period beginning with the permit's effective date and lasting until the permit's expiration date, the permittee is authorized to manage sewage sludge according to the approved SMP. The pollutants in sewage sludge and land application sites shall be limited and monitored by the permittee as specified below and reported in accordance with Part I.A.3 of the permit. Form S01 of the Discharge Monitoring Report (DMR) must be completed each time sludge is land applied. Analysis must be based on a representative sample of Arlington WPCP sludge that is being land applied.

SLUDGE CHARACTERISTICS	BASIS FOR LIMITATIONS	LIMITATIONS		MONITORING REQUIREMENTS	
		CEILING CONCENTRATION MAX (mg/kg)	MONTHLY AVG (mg/kg)	FREQUENCY	SAMPLE TYPE
Percent Solids (%)	9 VAC 25-31-10	NA	NL	1/Y	Composite
Total Arsenic	9 VAC 25-31-10	75	41	1/Y	Composite
Total Cadmium	9 VAC 25-31-10	85	39	1/Y	Composite
Total Copper	9 VAC 25-31-10	4300	1500	1/Y	Composite
Total Lead	9 VAC 25-31-10	840	300	1/Y	Composite
Total Mercury	9 VAC 25-31-10	57	17	1/Y	Composite
Total Molybdenum	9 VAC 25-31-10	75	NA	1/Y	Composite
Total Nickel	9 VAC 25-31-10	420	420	1/Y	Composite
Total Selenium	9 VAC 25-31-10	100	100	1/Y	Composite
Total Zinc	9 VAC 25-31-10	7,500	2,800	1/Y	Composite
pH (25^{o}C)	9 VAC 25-31-10	NL	NL	1/Y	Composite
Fecal Coliform or *Salmonella*	9 VAC 25-31-10	NA	NA	1/5Y	Composite
Level of Pathogen Requirements Achieved		The approved SMP Indicates that Class B Sludge is produced when the current level of treatment is used. When this type of treatment is used, a number 2 should be reported on the DMR under item 688 (2).			
Pathogen Alternative Used		The approved SMP indicates that Alternative 2, lime stabilization, is used. This is represented by a number 2 on the DMR under item 689 (2).			
Vector Attraction Reduction Alternative Used		The approved SMP indicates that Option 6, raising sludge pH under specified conditions, is used for Vector Attraction Reduction. This is represented by a number 6 on the DMR under item 690 (6).			

NL = No limitation, monitoring required. NA = Not Applicable 1 /Y = Once per year.
1 /5Y = Once per every five years.

(1) Dry weight basis unless otherwise stated.

(2) Pathogen Reduction. (Class B, Alternative 2 – Lime Stabilization): Sewage sludge is treated through raising the pH of the sludge to 12 SU for at least two hours. If the required time and pH holding conditions cannot be met, fecal coliform testing shall be conducted in accordance with Table 3 of the VDH Biosolids Use Regulations (12 VAC 5-583) to prove that adequate pathogen reduction has been achieved. The permittee shall adequately perform monitoring and maintain bench sheets to ensure that the required pH and holding time are strictly adhered to. Copies of the bench sheets shall be submitted with annual reports for sludge analysis.

(3) Vector Attraction Reduction, Option 6 – (Raising Sludge pH Under Specified Conditions): As stated in 9 VAC 25-31-720.B.6, the pH of the sewage sludge is to be raised to 12 SU or higher and maintained at 11.5 SU – 12 SU for at least 22 hours without the addition of more alkaline material. The permittee shall adequately monitor the sludge pH and holding time to ensure that the required reduction is being achieved. Copies of the bench sheet shall be submitted with annual reports for sludge analysis.

(4) The monitoring frequency for all parameters listed above, with the exception of fecal coliform bacteria or *Salmonella*, shall be increased to once every two months if the results of sludge monitoring for any limited pollutant is greater than 75% of the monthly average concentration limitation

(5) All sampling shall be collected and analyzed in accordance with the approved Operations and Maintenance (O&M) Manual and SMP.

21. Other Special Conditions :

a) 95% Capacity Reopener. The VPDES Permit Regulation at 9 VAC 25-31-200.B.2 requires all POTWs and PVOTWs develop and submit a plan of action to DEQ when the monthly average influent flow to their sewage treatment plant reaches 95% or more of the design capacity authorized in the permit for each month of any three consecutive month period. This facility is a POTW.

b) Indirect Dischargers. Required by VPDES Permit Regulation, 9 VAC 25-31-280 B.9 for POTWs and PVOTWs that receive waste from someone other than the owner of the treatment works.

c) O&M Manual Requirement. Required by the Code of Virginia (§62.1-44.19); the Sewage Collection and Treatment Regulations (9 VAC 25-790), and the VPDES Permit Regulation (9 VAC 25-31-190.E). Within 90 days of the effective date of this permit, the permittee shall submit for approval an Operations and Maintenance (O&M) Manual or a statement confirming the accuracy and completeness of the current O&M Manual to the Department of Environmental Quality, Northern Regional Office (DEQ-NRO). Future changes to the facility must be addressed by the submittal of a revised O&M Manual within 90 days of the changes. Non-compliance with the O&M Manual shall be deemed a violation of the permit.

d) CTC, CTO Requirement. The Code of Virginia (§ 62.1-44.19) and the Sewage Collection and Treatment Regulations (9 VAC 25-790) require that all treatment works treating wastewater obtain a Certificate to Construct prior to commencing construction and to obtain a Certificate to Operate prior to commencing operation of the treatment works.

e) Water Quality Criteria Monitoring. State Water Control Law §62.1-44.21 authorizes the Board to request information needed to determine the discharge's impact on State waters. States are required to review data on discharges to identify actual or potential toxicity problems, or the attainment of water quality goals, according to 40 CFR Part 131, Water Quality Standards, subpart 131.11. Should effluent monitoring for Total Recoverable Copper or Tetrachloroethylene indicate the need for any water quality-based limitations, this permit may be modified or alternatively revoked and reissued to incorporate appropriate limitations.

f) Licensed Operator Requirement. The Code of Virginia at §54.1-2300 et seq. and the VPDES Permit Regulation at 9 VAC 25-31-200 D, and the Rules and Regulations for Waterworks and Wastewater Works Operators (18 VAC 160-20-10 et seq.) requires licensure of operators. This facility requires a Class I operator.

g) Reliability Class. The Sewage Collection and Treatment Regulation at 9 VAC 25-790 requires sewerage works achieve a certain level of reliability in order to protect water quality and public health consequences in the event of component or system failure. The facility is required to meet a Reliability Class of I.

h) Nutrient Reopener. 9 VAC 25-40-70 A authorizes DEQ to include technology-based annual concentration limits in the permits of facilities that have installed nutrient control equipment, whether by new construction, expansion, or upgrade. 9 VAC 25-31-390 A authorizes DEQ to modify VPDES permits to promulgate amended water quality standards.

i) E3/E4. 9 VAC 25-40-70 B authorizes DEQ to approve an alternate compliance method to the technology-based effluent concentration limitations as required by subsection A of this section. Such alternate compliance method shall be incorporated into the permit of an Exemplary Environmental Enterprise (E3) facility or an Extraordinary Environmental Enterprise (E4) facility to allow the suspension of applicable technology-based effluent concentration limitations during the period the E3 or E4 facility has a fully implemented environmental management system that includes operation of installed nutrient removal technologies at the treatment efficiency levels for which they were designed.

j) Final Effluent Monitoring Alternative. 9 VAC 25-31-30 Federal Effluent Guidelines incorporates by reference Secondary Treatment 40 CFR Part 133 (1999). 40 CFR Part 133.104 permits the substitution of chemical oxygen demand (COD) or total organic carbon (TOC) for BOD_5 when a long-term BOD_5: COD or BOD_5: TOC correlation has been demonstrated. This special condition allows the permittee to develop a facility specific correlation between $cBOD_5$ and COD for final effluent compliance monitoring.

The permittee may submit to DEQ for review and approval a plan of study prior to the start of the study. The plan shall include: method of analysis for COD or TOC, QA/QC procedures for the method, time frame for study, number of samples to be analyzed to establish the correlation, the statistical methods for determining the correlation, and the method of validating the established correlation.

Once the study is completed and a correlation is established the data, QA/QC information, and correlation calculations are to be submitted to DEQ for review and approval. Upon DEQ's approval of the results, the correlation shall be used to calculate monthly average and weekly average COD or TOC effluent limits and monitoring for COD or TOC will be once per day and sampling will be 24 hour composites. Monitoring for $cBOD_5$ shall be reduced to once per week for the remaining term of the permit. COD or TOC results shall be reported in accordance with Part II.C.

The facility shall be required to validate the established correlation outlined in the plan of study and report the validation with the monthly DMR. A summary of the validation data shall also be submitted with the permit application. If the facility fails to submit the summary validation data, the permittee will have to complete a new study for review and approval by DEQ and also return to $cBOD_5$ final effluent monitoring at the frequency required by the permit prior to beginning COD or TOC monitoring.

This special condition also allows the facility to cease COD or TOC final effluent monitoring and return to $cBOD_5$ monitoring initially established at the time of permit reissuance by notifying DEQ in writing. The $cBOD_5$ final effluent monitoring will become effective the first day of the next month following the written request.

k) Bypass Point Sources. The VPDES Permit Regulation at 9 VAC 25-31-190 states that the permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. The permittee is not authorized to discharge from any location except Outfall 001 except as provided for in 9 VAC 25-31-190 and Part II.U of this permit

The permittee shall notify the Alexandria and Arlington Health Departments and DEQ of each external bypass event as soon as possible but in no case more than 24 hours after the initial discharge enters Four Mile Run. .

l) PCB Monitoring. This special condition shall require the permittee to monitor and report PCB concentrations in dry weather and wet weather effluent samples. The results from this monitoring shall be used to implement the PCB TMDL that was developed for the Potomac River and approved by EPA in October 2007. This facility was given a WLA in the TMDL.

m) TMDL Reopener: This special condition is to allow the permit to reopened if necessary to bring it in compliance with any applicable TMDL that may to developed and approved for the receiving stream.

22. Permit Section Part II. Part II of the permit contains standard conditions that appear in all VPDES Permits. In general, these standard conditions address the responsibilities of the permittee, reporting requirements, testing procedures and records retention.

23. Changes to the Permit from the Previously Issued Permit:

a) Standards

1) For the 2006 assessment, the NEW-7 special standards designation was removed. Thus, this special standards designation has been removed from this permit.

b) Special Conditions:
1) The Pretreatment language (Permit Part I.C) and the Toxics Management Program (Permit Part I.D) language were updated to reflect current agency guidance.
2) The Nutrient Enriched Waters Reopener has been removed.
3) The O&M Manual Requirement and the CTC, CTO Requirement have been separated into two special conditions.
4) A Water Quality Criteria Special Condition has been added.
5) An E3/E4 Special Condition has been added.
6) A Nutrient Reopener Special Condition has been added.
7) A Special Condition requiring monitoring for PCBs has been included.

c) Monitoring and Effluent Limitations:
1) Monitoring and effluent limitations were added for nitrogen (total nitrogen, total nitrogen – year to date, total nitrogen – calendar year) and phosphorus (total phosphorus, total phosphorus – year to date, total phosphorus – calendar year).
2) Monitoring for Nitrate + Nitrite was placed in the permit to replace the individual monitoring for nitrate and nitrite.
3) Mass limits for phosphorus are now expressed in pounds instead of kilograms.
4) Monitoring for orthophosphorus has been removed.
5) Quarterly monitoring for Total Recoverable Copper and tetrachloroethylene has been placed into the permit.
6) The mass limits for ammonia have been removed from this permit.

24. Variances/Alternate Limits or Conditions:
The Arlington WPCP has been allowed a minimum chlorine contact value of 0.5 mg/l since fecal coliform values demonstrated that disinfection standards were met.

25. Public Notice Information:

First Public Notice Date: 8/21/2008 Second Public Notice Date: 8/28/2008

Public Notice Information is required by 9 VAC 25-31-280 B. All pertinent information is on file and may be inspected, and copied by contacting the: Northern Virginia DEQ Regional Office, 13901 Crown Court, Woodbridge, VA 22193, Telephone No. (703) 583-3837, atwesternik@deq.virginia.gov. See **Attachment 12** for a copy of the public notice document.

Persons may comment in writing or by email to the DEQ on the proposed permit action, and may request a public hearing, during the comment period. Comments shall include the name, address, and telephone number of the writer, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing if public response is significant. Requests for public hearings shall state the reason why a hearing is requested, the nature of the issues proposed to be raised in the public hearing and a brief explanation of how the requester's interests would be directly and adversely affected by the proposed permit action. Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given.

26. 303 (d) Listed Stream Segments and Total Max. Daily Loads (TMDL):

The Arlington WPCP discharges to the tidal portion of Four Mile Run, which flows to the Potomac River. The freshwater tidal Potomac River has a fish consumption advisory due to the presence of PCBs in the waterway. A TMDL for PCBs has been prepared for the Potomac River and was approved by EPA on October 31, 2007. The Arlington WPCP shall collect two wet weather samples and two dry weather samples during the term of this permit.

Sufficient excursions from the instantaneous *E. coli* bacteria criterion (7 of 17 samples - 41.2%) were recorded at DEQ's ambient water quality monitoring station (1aFOU000.19) at the George Washington Parkway crossing to assess this stream segment as not supporting of the recreation use goal for the 2008 water quality assessment. The segment was previously listed for a fecal coliform bacteria impairment, from 1996 through 2006. The *E. coli* bacteria impairment was first listed in 2004.

27. Additional Comments:

a) Development of the Policy for the Potomac River Embayments (9 VAC 25-415-10):

The State Water Control Board adopted the Potomac Embayment Standards (PES) in 1971 to address serious nutrient enrichment problems evident in the Virginia embayments and Potomac River at the time. These standards applied to sewage treatment plants discharging into Potomac River embayments in Virginia and for expansions of existing plants discharging into the non-tidal tributaries of these embayments. The standards were actually effluent limitations for BOD, unoxidized nitrogen, total phosphorus, and total nitrogen:

Parameter	PES Standard (monthly average)
BOD_5	3 mg/l
Unoxidized Nitrogen	1 mg/l (April – October)
Total Phosphorus	0.2 mg/l
Total Nitrogen	1 mg/l (when technology is available)

Based upon these standards, several hundred million dollars were spent during the 1970s and 1980s upgrading major treatment plants in the City of Alexandria and the counties of Arlington, Fairfax, Prince William, and Stafford. Today, these localities operate advanced wastewater treatment plants that have contributed a great deal to the dramatic improvement in the water quality of the upper Potomac estuary.

Before the planned upgrades at these facilities were completed, and the water quality improved, questions arose over the high capital and operating costs that would result from meeting all of the requirements contained in the PES. Questions also arose because the PES were blanket effluent limitations that applied equally to different bodies of water. Therefore, in 1978, the State Water Control Board committed to reevaluate the PES. In 1984, a major milestone was reached when the Virginia Institute of Marine Science (VIMS) completed state-of-the-art models for each of the embayments. The Board then selected NVPDC to conduct wasteload allocation studies of the Virginia embayments using the VIMS models. In 1988, these studies were completed and effluent limits that would protect the embayments and the mainstem of the Potomac River were developed for each major facility (**Attachment 13**).

Since the PES had not been amended or repealed, VPDES permits had included the PES standards as effluent limits. Since the plants could not meet all of the requirements of the PES, the plant owners operated under consent orders or consent decrees with operating effluent limits for the treatment plants that were agreed upon by the owners and the Board.

In 1991 and 1992, several Northern Virginia jurisdictions with embayment treatment plants submitted a petition to the Board requesting that the Board address the results of the VIMS/NVPDC studies. Their petition requested revised effluent limitations and a defined modeling process for determining effluent limitations.

The recommendations in the petition were designed to protect the extra sensitive nature of the embayments along with the Potomac River, which had become a popular recreational resource during recent years. The petition included requirements more stringent than would be applied using the results of the modeling/allocation work conducted in the 1980s. With the inherent uncertainty of modeling, the petitioners question whether the results of modeling would provide sufficient protection for the embayments. By this petition, the local governments asked for continued special protection for the embayments based upon a management approach that uses stringent effluent limits. They believe this approach has proven successful over the past two decades. In addition, the petition included a modeling process that will be used to determine if more stringent limits are needed in the future due to increased wastewater discharges.

The State Water Control Board adopted the petition, with revisions, as a regulation on September 12, 1996. The regulation is entitled *Policy for the Potomac River Embayments* (9 VAC25-415-10, **Attachment 14**). On the same date, the Board repealed the old PES. The new regulation became effective on April 3, 1997, and contains the following effluent limits:

Parameter	PES Standard (monthly average)
$cBOD_5$	5 mg/l
TSS	6 mg/l
Total Phosphorus	0.18 mg/l
Ammonia as Nitrogen	1 mg/l (April - October)

The Policy for the Potomac River Embayments at 9 VAC 25-415-50 states in part that, "water quality models may be required to predict the effects of wastewater discharges on the water quality of the receiving waterbody, the embayment, and the Potomac River. The purpose of the modeling shall be to determine if more stringent limits than those required by 9 VAC 25-415-40 are required to meet water quality standards."

b) Previous Board Actions:
On March 15, 2005, a Consent Special Order was issued by the State Water Control Board to the Arlington County Board in response to issues with wet weather flows to the Arlington County WPCP. In September 2007, DEQ-NRO enforcement staff granted an extension to comply with some deadlines set forth in Appendix A of the consent order. See **Attachment 15** for the Consent Order Schedule of Compliance and the revised project schedule.

On April 8, 2004, the Arlington County WPCP was referred to enforcement for failure to verify or submit an updated O&M Manual, total phosphorus exceedances, and failure to submit a toxicity test. The case was dereferred on October 1, 2004 because compliance was achieved through informal action.

On April 1, 2002, a Consent Special Order was issued by the State Water Control Board to the Arlington County Board for issues concerning bypasses from the Arlington County WPCP. On February 12, 2003, DEQ determined that the Arlington County Board had complied with all terms in Appendix A of the Consent Special Order; and hence, cancelled the aforementioned

c) Public Comment: No comments were received during the public notice period.

d) EPA Checklist: The checklist can be found in **Attachment 16**.

List of Attachments

Attachment 1	Flow Frequency Information
Attachment 2	Arlington County WPCP Unit Process Flow Diagram
Attachment 3	USGS Topographic Map 204D (Alexandria) showing Outfall 001 and the Bypass Point in Relation to the Potomac River
Attachment 4	Summary of Volumes and Spill Prevention Measures for all Materials Stored Onsite
Attachment 5	Technical Summary from the December 18, 2007 Inspection
Attachment 6	March 27, 2008 Planning Statement for the Arlington County WPCP
Attachment 7	Dissolved Oxygen Water Quality Criteria
Attachment 8	Commonwealth of Virginia Freshwater Water Quality Criteria and Wasteload Allocations and District of Columbia Water Quality Standards
Attachment 9	Summary of Effluent Data
Attachment 10	Toxics Effluent Limits Calculations
Attachment 11	TMP Chronic Endpoint Determination
Attachment 12	Public Notice
Attachment 13	Potomac Embayments Wasteload Allocation Study (Executive Summary, Sensitivity Results for Four Mile Run, Final WLA Alternative Analysis for Four Mile Run)
Attachment 14	Policy for the Potomac River Embayments (9 VAC 25-415-10 et seq.)
Attachment 15	Appendix A of Current Consent Order and 2007 Revised Schedule
Attachment 16	EPA Checklist

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION
Water Quality Assessments and Planning
629 E. Main Street P.O. Box 10009 Richmond, Virginia 23240

SUBJECT: Flow Frequency Determination
Arlington STP - VA#0025143

TO: Doug Stockman, NRO

FROM: Paul E. Herman, P.E., WQAP

DATE: February 6, 1998

COPIES: Ron Gregory, Charles Martin, File

This memo supercedes my July 25, 1994 memo to Kultar Singh concerning the subject VPDES permit.

The Arlington STP discharges to the Fourmile Run in Arlington, VA. Stream flow frequencies are required at this site for use by the permit writer in developing effluent limitations for the VPDES permit. The Policy for the Potomac Embayments (PES) apply to this facility thereby requiring special flow frequency analyses to determine the 1Q10 and 7Q10 during the winter months (November - March) defined by the Standard. The 1Q10 and 7Q10 flow frequencies for the summer months (April - October) are based on the analysis of data available for the period of record at the selected reference gaging station.

Fourmile Run is tidal at the discharge point. Flow frequencies are indeterminable at this site due to tidal fluctuation. A dilution factor should be used when determining effluent limitations. For more information on dilution factors, please contact Dale Phillips at (804) 698-4077.

For modeling purposes, the freshwater contribution from the Fourmile Run watershed have been calculated for the specified flow frequencies. These calculations applied drainage area proportions using a continuous record gage as a reference.

The seasonal, temperature based, flow frequencies have been determined for the reference gage used in this analysis; Fourmile Run at Alexandria, VA (#01652500) which has been operated by the USGS from 1951 to 1969, from 1973 to 1975, and from 1979 to 1982. The gage is located approximately 1.0 mile upstream of the discharge point. The flow frequencies for the gage and the discharge point are presented below.

Fourmile Run at Alexandria, VA (#01652500):

Drainage Area = 13.8 mi^2

1Q10 = 0.59 cfs	PES 1Q10 = 1.68 cfs
7Q10 = 0.80 cfs	PES 7Q10 = 2.20 cfs
30Q5 = 1.8 cfs	HM = 0.0 cfs

The flows provided below represent the freshwater inflow to the Fourmile Run.

Fourmile Run at discharge point:

Drainage Area = 16.88 mi^2

1Q10 = 0.72 cfs	PES 1Q10 = 2.1 cfs
7Q10 = 0.98 cfs	PES 7Q10 = 2.7 cfs
30Q5 = 2.2 cfs	HM = 0.0 cfs

Be advised, the seasonal tiering defined in the Policy for Potomac Embayments is not based on stream flow. Rather, the tiers are temperature based. Procedures for establishing flows during the months included in a temperture tier are not addressed in Section III-A pages 12-17 of the "Virginia Water Control Board VPDES Technical Reference Manual".

If you have any questions concerning this analysis, please let me know.

Westernik,Anna

From: Powell,Gene
Sent: Wednesday, July 30, 2003 4:44 PM
To: Westernik,Anna
Subject: RE: 4-Mile Run 30Q10 Data

Anna, using what data is available for Four Mile Run from 1951-1969, 1974-1975, 1979-1982, and 1998-2001, the 30Q10 is 2.7cfs for months of November thru March, and the 30Q10 is 0.91cfs for months of April thru October.

Gene

-----Original Message-----
From: Westernik,Anna
Sent: Monday, July 28, 2003 10:36 AM
To: Powell,Gene
Subject: 4-Mile Run 30Q10 Data

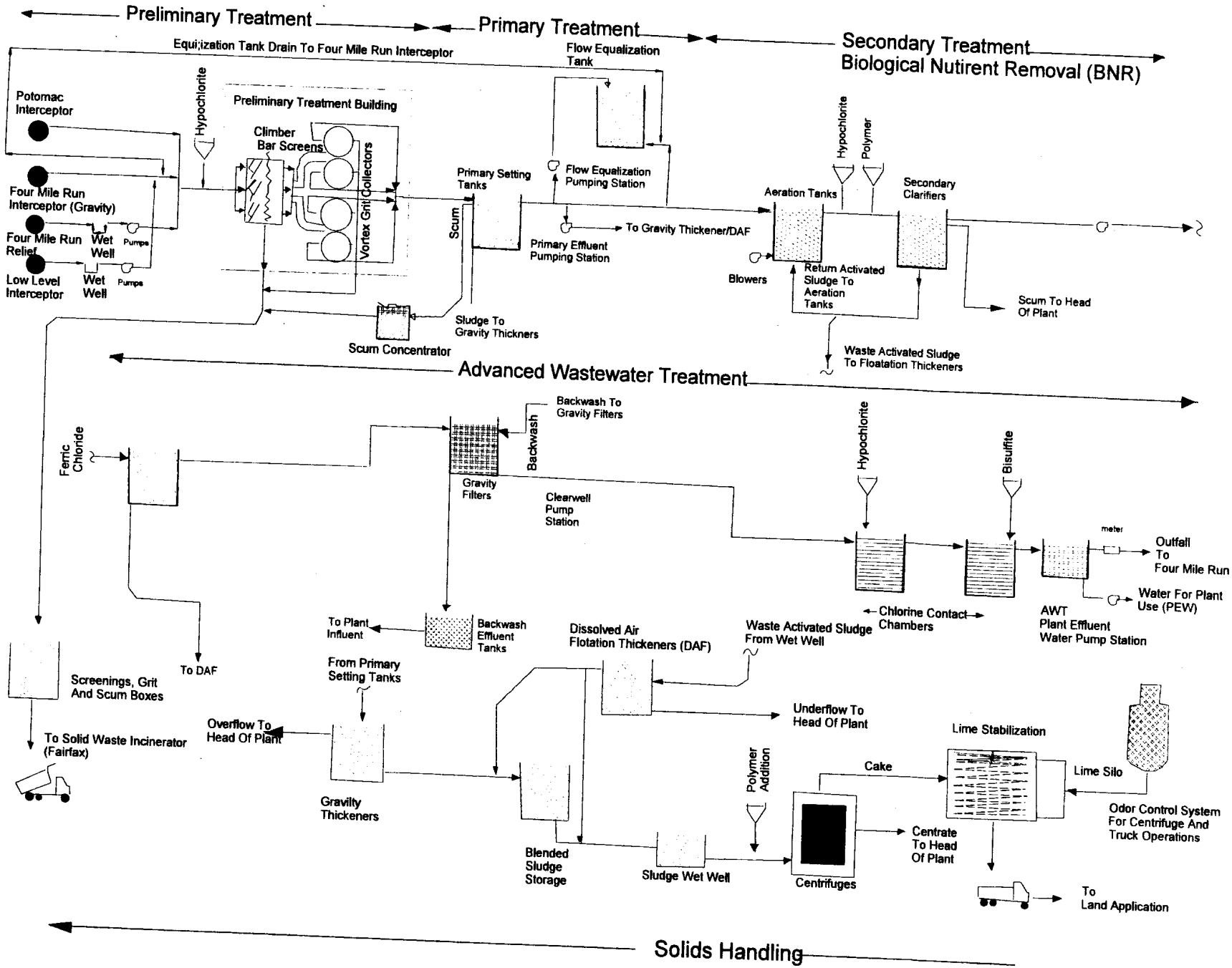
Hi Gene,

Could you please send me an e-mail verifying the high and low flow 30Q10 data (Nov-Mar and Apr-Oct) for USGS Station 01652500 on Four Mile Run we discussed on July 15?

Thanks,

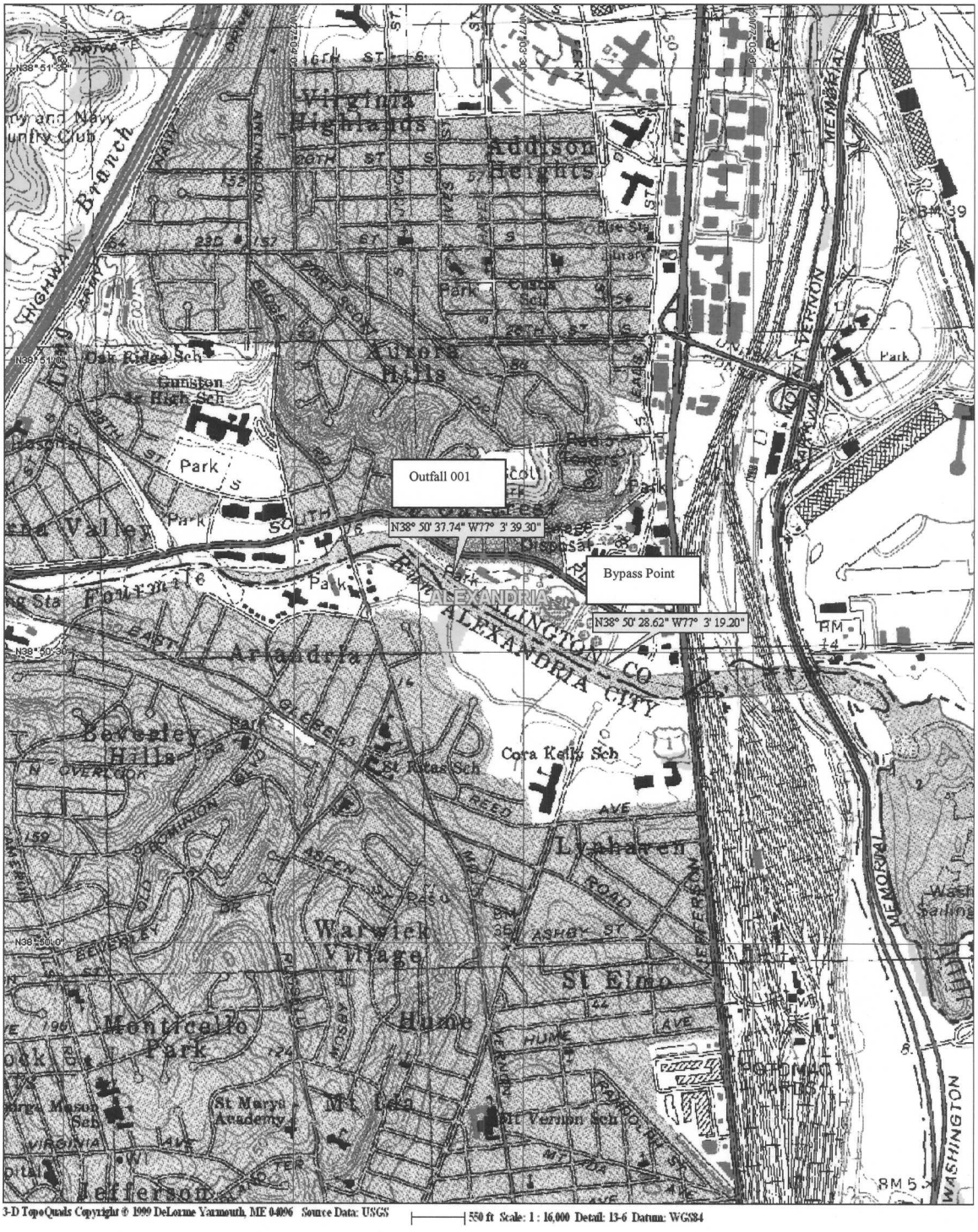
Anna T. Westernik
Environmental Specialist II
Telephone 703-583-3837
Fax 703-583-3841

Arlington County Water Pollution Control Plant
Unit Process Flow Diagram



Attachment 2

Outfalls 001 and the Bypass of the Arlington Water Pollution Control Plant (VA0025143)



Distance between Outfalls 001 and 002 is approximately 1900 feet.

Attachment 3

Arlington County Water Pollution Control Plant
Chemical Storage

Chemicals Storage And Containment

Building	Chemical Stored	Maximum Amount Stored	Type of Storage	Type of Containment
Biological Solids Processing Building 536 South 31st Street	Polymer Sodium Hypochlorite, 5%	7,500 gallons 7,500 gallons	AST AST	Both AST's in building basement: no access to the environment
Dewatering Building 3208 South Eads Street	Sulfuric Acid , 93% Sodium Hypochlorite, 5% Lime, unhydrated	1,500 gallons 3,750 gallons 300,000 lbs	AST AST AST	Inside building, with subfloor spill containment Building basement: no access to the environment No containment: material is solid
Preliminary Treatment Building 3139 South Fern Street	Sodium Hypochlorite, 5%	3,750 gallons	AST	Inside building with subfloor spill containment
Blower Building (3404 South Glebe Road)	Sodium hypochlorite, 5% Sodium hydroxide, 40%	2,300 gallons 3,770 gallons	AST AST	Both AST in building with separate spill containment birms
Secondary Pump Room (3440 South Glebe Road)	Sodium hypochlorite, 5%	1900 gallons	AST	Inside building with containment birm
Temporary Ferric Feed System (3500 S.Glebe Road)	Ferric chloride, 30%	17,400 gallons	AST	Outside: double walled tanks and piping
Chlorination/ Dechlorination Building 3304 S Glebe Road	Sodium hypochlorite, 5-15% Sodium bisulfite, 30%	72,000 54,000	AST AST	Both materials are stored inside building with separate subfloor spill containment

Attachment 4

SUMMARY

Comments/Recommendations for action noted during the March 21, 2007 inspection. **All relative updates are in BOLD**

- At the time of inspection foam was overflowing several of the aeration basins. The overflow troughs, walkways and one pump were partially or fully engulfed. It was noted that areas within the tank as well as the walkways were dried, indicating an ongoing problem. Facility personnel need to clean the overflow areas to allow access to the basins and evaluate ways of "knocking back" the foam and "moving" the dead areas (See next comment) to prevent movement to downstream process units and/or reaching the ground (a reportable overflow). **Although foam is still present facility has taken steps to prevent the excessive overflows. A defoaming agent is being introduced into the A pass of each basin on an as needed basis.**
- Several of the spray nozzles on the aeration basins are cracked or broken. Efforts should be made to repair or replace the nozzles. **Most of the nozzles have been returned to service.**
- Several of the air diffusers for the aeration basins are broken causing excessive air (rapid like conditions) to be introduced into the system. Mr. Garrett noted that the units were on the list for repair and as soon as weather and flow allowed they would be taken care of. **The facility has repaired some of the diffusers as flow and weather have allowed – See comment from 12/18/07 inspection.**
- Further information about this item was requested on March 28, 2007 via e-mail. Please provide information concerning the secondary containment and cleanup provisions, floor drains, and the MSDS on the stacked drum. The container marked "hazardous" is light bulb storage. Mr. Garrett noted that the container should not have been located in that spot and was investigating reason why container had not been returned to its proper location. **Container was returned to proper location.**

Comments/Recommendations for action noted during the December 18, 2007 inspection.

- **The overall appearance of the facility looks good considering the number of sub-contactors involved with the active construction.**
- **Photo 6: A puddle was discovered in the basement of the solids processing building. *Follow up correspondence with the facility on 1/8/08 revealed the sources of the water have been identified and the leaks repaired.***
- **Photo 10: Excessive aeration from broken diffusers – repair of these units is ongoing as flow and weather conditions allow.**
- **Photo 13-14: Secondary clarifiers 4-6 – the sludge blankets are close to the surface and the scum collection system is no longer working. Discussion with Mr. Garrett revealed the following:**
    - **the scum removal system was damaged during construction – water lines were severed. Work order has been submitted.**
    - **the defoaming agent being introduced breaks the filament "backbone" causing large floc to breakoff in the clarifiers.**
- **Facility should continue daily and long-term maintenance of the aeration basins to prevent re-occurrence of the overflow conditions observed in March.**
- **A number of new generators have been installed – facility should ensure that all units have been permitted accordingly through DEQ's Air Program.**

Bypass Summary		
Date	**Volume**	**Comments**
3/2/07	**10 MG**	**System Upset – gravity filters were bypassed – influent directed to disinfection**
3/16/07	**9.67 MG**	**Bypass of filters to disinfection** **Bypass of primary tanks due to heavy rainfall**
4/15/07	**20.22 MG**	**Heavy rain – bypasses of primary to disinfection** **Gravity Filter Influent diverted to disinfection**
9/5/07	**10 MG**	**Construction contactors hit scum line in the evacuation trench**
9/6/07	**100 MG**	**Primary effluent released onto grass due to construction shutdown – overflow of EQ tank to bypass channel which then overflowed**
10/27/07	**9.34 MG**	**Heavy rain caused primary effluent to be diverted to disinfection**

Attachment 6

To: Rob Swanson
From: Anna Westernik

Date: March 27, 2008
Subject: Planning Statement for the Arlington WPCP
VA0025143

Discharge Type: Municipal
Discharge Flow: 40 mgd

Receiving Stream: Four Mile Run
Latitude / Longitude: 38° 50' 37.74"/ 77° 03' 39.30"

1. Is there monitoring data for the receiving stream? Yes.
   - If yes, please attach latest summary.
   The discharge is into Four Mile Run at segment VAN-A12E_FOU01A00. The assessment unit summary for this segment is attached below. The downstream monitoring station is 1aFOU000.19, at George Washington Parkway, located approximately 0.75 rivermiles downstream from the facility outfall.

The 2006 assessment unit summary is as follows. The impairments are bolded (4), while the observed effects are italicized (2).

Class II, Section 6, special stds. b, y.

DEQ special study station 1AFOU000.19, at George Washington Parkway.

Historical Note: This segment was included in Attachment A, Category 1, Part 1 of Virginia's 1998 Part 1A submittal for fecal coliform.

Historical Note: DEQ fish tissue monitoring station 1AFOU000.45 was last sampled in 1997.

Historical Note: *The ER-M criteria for chlordane, 6 parts per billion (ppb) dry weight, was exceeded in a sediment sample collected in 1999 at monitoring station 1AFOU000.19.*

Historical Note: For the 2006 assessment, the NEW-7 special standards designation was removed. Additionally, the estuarine area, in square miles, was corrected to reflect the actual size of the polygon, which represents the same assessed area as the last assessment.

The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory. The advisory, dated 4/19/99 and modified 12/13/04, limits consumption of American eel, bullhead catfish, channel catfish less than eighteen inches long, largemouth bass, anadromous (coastal) striped bass, sunfish species, smallmouth bass, white catfish, white perch, gizzard shad, and yellow perch consumption to no more than two meals per month. The advisory also restricts the consumption of carp and channel catfish greater than eighteen inches long. The affected area includes the tidal portions of the following tributaries and embayments from the I-395 bridge (above the Woodrow Wilson Bridge) to the Potomac River Bridge at Route 301: Fourmile Run, Hunting Creek, Little Hunting Creek, Pohick Creek, Accotink Creek, Occoquan River, Neabsco Creek, Powell Creek, Quantico Creek, Chopawamsic Creek, Aquia Creek, and Potomac Creek.

Fecal coliform and E.coli monitoring finds a bacteria impairment, resulting in an impaired classification for the recreation use. Because submerged aquatic vegetation subuse of the aquatic life use was not met, the segment is considered impaired for the aquatic life use. There is insufficient information to determine if the open water aquatic life subuse is met; the thirty day mean is acceptable, however, the seven day mean and instantaneous levels have not been assessed. *Additionally, three of 17 samples (17.6%) exceeded the total phosphorus screening value of 0.20 mg/L, noted by an observed effect.* The wildlife use is considered fully supporting.

2004 TMDL ID for this segment was VAN-A12E-01.

- If no, where is the nearest downstream monitoring station. NA

2. Is the receiving stream on the current 303(d) list? Yes.

   - If yes, what is the impairment?
   Tidal Fourmile Run is listed for with four impairments for the 2006 Integrated Assessment. Two are for bacteria parameters (*E. coli* and fecal coliform), one for PCBs in fish tissue, and one for insufficient acreage of submerged aquatic vegetation. However, the last of these (SAV) is expected to be delisted during the 2008 Integrated Assessment process.

   - Has the TMDL been prepared?
   The fish tissue in PCBs TMDL for the tidal Potomac River was approved by EPA on 10/31/07.

   - If yes, what is the WLA for the discharge?
   The facility was **noted to be a significant sources of PCBs** and was included in the TMDL, as mentioned above. Additionally, the Water Quality Management Planning Regulation (9VAC25-720) provides the facility **with nutrient WLAs of 365,467 lbs/yr (Total Nitrogen) and 21,928 lbs/yr (Total Phosphorus)**.

   - If no, what is the schedule for the TMDL?
   The bacteria TMDL for tidal Fourmile Run is expected to be completed in 2009.

3. If the answer to (2) above is no, is there a downstream 303(d) listed impairment? NA

   - If yes, what is the impairment? NA

   - Has a TMDL been prepared? NA

   - Will the TMDL include the receiving stream? NA

   - Is there a WLA for the discharge? NA

   - What is the schedule for the TMDL? NA

4. Is there monitoring or other conditions that Planning/Assessment needs in the permit?
   Please include the agreed upon language regarding monitoring for PCBs.

5. Could you please calculate the drainage area at the outfall?
   An estimation of the drainage area above the facility outfall is approximately 17.298 square miles (11,070.89 acres).

Dissolved Oxygen Criteria (9 VAC 25-260-185)

Designated Use	Criteria Concentration/Duration	Temporal Application
Migratory fish spawning and nursery	7-day mean > 6 mg/L (tidal habitats with 0-0.5 ppt salinity)	February 1 – May 31
	Instantaneous minimum > 5 mg/L	
Open-water[1,2]	30-day mean > 5.5 mg/L (tidal habitats with 0-0.5 ppt salinity) 30-day mean > 5 mg/L (tidal habitats with >0.5 ppt salinity)	Year-round
	7-day mean > 4 mg/L	
	Instantaneous minimum > 3.2 mg/L at temperatures < 29°C Instantaneous minimum > 4.3 mg/L at temperatures > 29°C	
Deep-water	30-day mean >3 mg/L	June 1-September 30
	1-day mean > 2.3 mg/L	
	Instantaneous minimum > 1.7 mg/L	
Deep-channel	Instantaneous minimum > 1 mg/L	June 1-September 30

[1]See subsection aa of 9 VAC 25-260-310 for site specific seasonal open-water dissolved oxygen criteria applicable to the tidal Mattaponi and Pamunkey Rivers and their tidal tributaries.

[2]In applying this open-water instantaneous criterion to the Chesapeake Bay and its tidal tributaries where the existing water quality for dissolved oxygen exceeds an instantaneous minimum of 3.2 mg/L, that higher water quality for dissolved oxygen shall be provided antidegradation protection in accordance with section 30 subsection A.2 of the Water Quality Standards.

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: The Arlington County WPCP Permit No.: VA0025143

Receiving Stream: Four Mile Run Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO3) =	177 mg/L
90% Temperature (Annual) =	27.6 deg C
90% Temperature (Wet season) =	21.7 deg C
90% Maximum pH =	7 SU
10% Maximum pH =	6.4 SU
Tier Designation (1 or 2) =	1
Public Water Supply (PWS) Y/N? =	n
Trout Present Y/N? =	n
Early Life Stages Present Y/N? =	y

Stream Flows

1Q10 (Annual) =	0 MGD
7Q10 (Annual) =	0 MGD
30Q10 (Annual) =	0 MGD
1Q10 (Wet season) =	0 MGD
30Q10 (Wet season)	0 MGD
30Q5 =	0 MGD
Harmonic Mean =	0 MGD
Annual Average =	0 MGD

Mixing Information

Annual - 1Q10 Mix =	100 %
- 7Q10 Mix =	100 %
- 30Q10 Mix =	100 %
Wet Season - 1Q10 Mix =	100 %
- 30Q10 Mix =	100 %

Effluent Information

Mean Hardness (as CaCO3) =	177 mg/L
90% Temp (Annual) =	27.6 deg C
90% Temp (Wet season) =	21.7 deg C
90% Maximum pH =	7 SU
10% Maximum pH =	6.4 SU
Discharge Flow =	40 MGD

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenapthene	0	--	--	na	2.7E+03	--	--	na	2.7E+03	--	--	--	--	--	--	--	--	--	--	na	2.7E+03
Acrolein	0	--	--	na	7.8E+02	--	--	na	7.8E+02	--	--	--	--	--	--	--	--	--	--	na	7.8E+02
Acrylonitrile [C]	0	--	--	na	6.6E+00	--	--	na	6.6E+00	--	--	--	--	--	--	--	--	--	--	na	6.6E+00
Aldrin [C]	0	3.0E+00	--	na	1.4E-03	3.0E+00	--	na	1.4E-03	--	--	--	--	--	--	--	--	3.0E+00	--	na	1.4E-03
Ammonia-N (mg/l) (Yearly)	0	3.61E+01	2.54E+00	na	--	3.6E+01	2.5E+00	na	--	--	--	--	--	--	--	--	--	3.6E+01	2.5E+00	na	--
Ammonia-N (mg/l) (High Flow)	0	3.61E+01	3.72E+00	na	--	3.6E+01	3.7E+00	na	--	--	--	--	--	--	--	--	--	3.6E+01	3.7E+00	na	--
Anthracene	0	--	--	na	1.1E+05	--	--	na	1.1E+05	--	--	--	--	--	--	--	--	--	--	na	1.1E+05
Antimony	0	--	--	na	4.3E+03	--	--	na	4.3E+03	--	--	--	--	--	--	--	--	--	--	na	4.3E+03
Arsenic	o	3.4E+02	1.5E+02	na	--	3.4E+02	1.5E+02	na	--	--	--	--	--	--	--	--	--	3.4E+02	1.5E+02	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Benzene [C]	0	--	--	na	7.1E+02	--	--	na	7.1E+02	--	--	--	--	--	--	--	--	--	--	na	7.1E+02
Benzidine [C]	0	--	--	na	5.4E-03	--	--	na	5.4E-03	--	--	--	--	--	--	--	--	--	--	na	5.4E-03
Benzo (a) anthracene [C]	0	--	--	na	4.9E-01	--	--	na	4.9E-01	--	--	--	--	--	--	--	--	--	--	na	4.9E-01
Benzo (b) fluoranthene [C]	0	--	--	na	4.9E-01	--	--	na	4.9E-01	--	--	--	--	--	--	--	--	--	--	na	4.9E-01
Benzo (k) fluoranthene [C]	0	--	--	na	4.9E-01	--	--	na	4.9E-01	--	--	--	--	--	--	--	--	--	--	na	4.9E-01
Benzo (a) pyrene [C]	0	--	--	na	4.9E-01	--	--	na	4.9E-01	--	--	--	--	--	--	--	--	--	--	na	4.9E-01
Bis2-Chloroethyl Ether	0	--	--	na	1.4E+01	--	--	na	1.4E+01	--	--	--	--	--	--	--	--	--	--	na	1.4E+01
Bis2-Chloroisopropyl Ether	0	--	--	na	1.7E+05	--	--	na	1.7E+05	--	--	--	--	--	--	--	--	--	--	na	1.7E+05
Bromoform [C]	0	--	--	na	3.6E+03	--	--	na	3.6E+03	--	--	--	--	--	--	--	--	--	--	na	3.6E+03
Butylbenzylphthalate	0	--	--	na	5.2E+03	--	--	na	5.2E+03	--	--	--	--	--	--	--	--	--	--	na	5.2E+03
Cadmium	0	7.5E+00	1.8E+00	na	--	7.5E+00	1.8E+00	na	--	--	--	--	--	--	--	--	--	7.5E+00	1.8E+00	na	--
Carbon Tetrachloride [C]	0	--	--	na	4.4E+01	--	--	na	4.4E+01	--	--	--	--	--	--	--	--	--	--	na	4.4E+01
Chlordane [C]	0	2.4E+00	4.3E-03	na	2.2E-02	2.4E+00	4.3E-03	na	2.2E-02	--	--	--	--	--	--	--	--	2.4E+00	4.3E-03	na	2.2E-02
Chloride	0	8.6E+05	2.3E+05	na	--	8.6E+05	2.3E+05	na	--	--	--	--	--	--	--	--	--	8.6E+05	2.3E+05	na	--
TRC	0	1.9E+01	1.1E+01	na	--	1.9E+01	1.1E+01	na	--	--	--	--	--	--	--	--	--	1.9E+01	1.1E+01	na	--
Chlorobenzene	0	--	--	na	2.1E+04	--	--	na	2.1E+04	--	--	--	--	--	--	--	--	--	--	na	2.1E+04

Attachment 8

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Chlorodibromomethane[C]	0	--	--	na	3.4E+02	--	--	na	3.4E+02	--	--	--	--	--	--	--	--	--	--	na	3.4E+02
Chloroform [C]	0	--	--	na	2.9E+04	--	--	na	2.9E+04	--	--	--	--	--	--	--	--	--	--	na	2.9E+04
2-Chloronaphthalene	0	--	--	na	4.3E+03	--	--	na	4.3E+03	--	--	--	--	--	--	--	--	--	--	na	4.3E+03
2-Chlorophenol	0	--	--	na	4.0E+02	--	--	na	4.0E+02	--	--	--	--	--	--	--	--	--	--	na	4.0E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	8.3E-02	4.1E-02	na	--	--	--	--	--	--	--	--	--	8.3E-02	4.1E-02	na	--
Chromium III	0	9.1E+02	1.2E+02	na	--	9.1E+02	1.2E+02	na	--	--	--	--	--	--	--	--	--	9.1E+02	1.2E+02	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.6E+01	1.1E+01	na	--	--	--	--	--	--	--	--	--	1.6E+01	1.1E+01	na	--
Chromium, Total	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Chrysene [C]	0	--	--	na	4.9E-01	--	--	na	4.9E-01	--	--	--	--	--	--	--	--	--	--	na	4.9E-01
Copper	0	2.3E+01	1.5E+01	na	--	2.3E+01	1.5E+01	na	--	--	--	--	--	--	--	--	--	2.3E+01	1.5E+01	na	--
Cyanide	0	2.2E+01	5.2E+00	na	2.2E+05	2.2E+01	5.2E+00	na	2.2E+05	--	--	--	--	--	--	--	--	2.2E+01	5.2E+00	na	2.2E+05
DDD [C]	0	--	--	na	8.4E-03	--	--	na	8.4E-03	--	--	--	--	--	--	--	--	--	--	na	8.4E-03
DDE [C]	0	--	--	na	5.9E-03	--	--	na	5.9E-03	--	--	--	--	--	--	--	--	--	--	na	5.9E-03
DDT [C]	0	1.1E+00	1.0E-03	na	5.9E-03	1.1E+00	1.0E-03	na	5.9E-03	--	--	--	--	--	--	--	--	1.1E+00	1.0E-03	na	5.9E-03
Demeton	0	--	1.0E-01	na	--	--	1.0E-01	na	--	--	--	--	--	--	--	--	--	--	1.0E-01	na	--
Dibenz(a,h)anthracene [C]	0	--	--	na	4.9E-01	--	--	na	4.9E-01	--	--	--	--	--	--	--	--	--	--	na	4.9E-01
Dibutyl phthalate	0	--	--	na	1.2E+04	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	--	--	na	1.2E+04
Dichloromethane (Methylene Chloride) [C]	0	--	--	na	1.6E+04	--	--	na	1.6E+04	--	--	--	--	--	--	--	--	--	--	na	1.6E+04
1,2-Dichlorobenzene	0	--	--	na	1.7E+04	--	--	na	1.7E+04	--	--	--	--	--	--	--	--	--	--	na	1.7E+04
1,3-Dichlorobenzene	0	--	--	na	2.6E+03	--	--	na	2.6E+03	--	--	--	--	--	--	--	--	--	--	na	2.6E+03
1,4-Dichlorobenzene	0	--	--	na	2.6E+03	--	--	na	2.6E+03	--	--	--	--	--	--	--	--	--	--	na	2.6E+03
3,3-Dichlorobenzidine[C]	0	--	--	na	7.7E-01	--	--	na	7.7E-01	--	--	--	--	--	--	--	--	--	--	na	7.7E-01
Dichlorobromomethane [C]	0	--	--	na	4.6E+02	--	--	na	4.6E+02	--	--	--	--	--	--	--	--	--	--	na	4.6E+02
1,2-Dichloroethane [C]	0	--	--	na	9.9E+02	--	--	na	9.9E+02	--	--	--	--	--	--	--	--	--	--	na	9.9E+02
1,1-Dichloroethylene	0	--	--	na	1.7E+04	--	--	na	1.7E+04	--	--	--	--	--	--	--	--	--	--	na	1.7E+04
1,2-trans-dichloroethylene	0	--	--	na	1.4E+05	--	--	na	1.4E+05	--	--	--	--	--	--	--	--	--	--	na	1.4E+05
2,4-Dichlorophenol	0	--	--	na	7.9E+02	--	--	na	7.9E+02	--	--	--	--	--	--	--	--	--	--	na	7.9E+02
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,2-Dichloropropane[C]	0	--	--	na	3.9E+02	--	--	na	3.9E+02	--	--	--	--	--	--	--	--	--	--	na	3.9E+02
1,3-Dichloropropene	0	--	--	na	1.7E+03	--	--	na	1.7E+03	--	--	--	--	--	--	--	--	--	--	na	1.7E+03
Dieldrin [C]	0	2.4E-01	5.6E-02	na	1.4E-03	2.4E-01	5.6E-02	na	1.4E-03	--	--	--	--	--	--	--	--	2.4E-01	5.6E-02	na	1.4E-03
Diethyl Phthalate	0	--	--	na	1.2E+05	--	--	na	1.2E+05	--	--	--	--	--	--	--	--	--	--	na	1.2E+05
Di-2-Ethylhexyl Phthalate [C]	0	--	--	na	5.9E+01	--	--	na	5.9E+01	--	--	--	--	--	--	--	--	--	--	na	5.9E+01
2,4-Dimethylphenol	0	--	--	na	2.3E+03	--	--	na	2.3E+03	--	--	--	--	--	--	--	--	--	--	na	2.3E+03
Dimethyl Phthalate	0	--	--	na	2.9E+06	--	--	na	2.9E+06	--	--	--	--	--	--	--	--	--	--	na	2.9E+06
Di-n-Butyl Phthalate	0	--	--	na	1.2E+04	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	--	--	na	1.2E+04
2,4 Dinitrophenol	0	--	--	na	1.4E+04	--	--	na	1.4E+04	--	--	--	--	--	--	--	--	--	--	na	1.4E+04
2-Methyl-4,6-Dinitrophenol	0	--	--	na	7.65E+02	--	--	na	7.7E+02	--	--	--	--	--	--	--	--	--	--	na	7.7E+02
2,4-Dinitrotoluene [C]	0	--	--	na	9.1E+01	--	--	na	9.1E+01	--	--	--	--	--	--	--	--	--	--	na	9.1E+01
Dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin) (ppq)	0	--	--	na	1.2E-06	--	--	na	na	--	--	--	--	--	--	--	--	--	--	na	na
1,2-Diphenylhydrazine[C]	0	--	--	na	5.4E+00	--	--	na	5.4E+00	--	--	--	--	--	--	--	--	--	--	na	5.4E+00
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	2.4E+02	2.2E-01	5.6E-02	na	2.4E+02	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	na	2.4E+02
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	2.4E+02	2.2E-01	5.6E-02	na	2.4E+02	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	na	2.4E+02
Endosulfan Sulfate	0	--	--	na	2.4E+02	--	--	na	2.4E+02	--	--	--	--	--	--	--	--	--	--	na	2.4E+02
Endrin	0	8.6E-02	3.6E-02	na	8.1E-01	8.6E-02	3.6E-02	na	8.1E-01	--	--	--	--	--	--	--	--	8.6E-02	3.6E-02	na	8.1E-01
Endrin Aldehyde	0	--	--	na	8.1E-01	--	--	na	8.1E-01	--	--	--	--	--	--	--	--	--	--	na	8.1E-01

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	na	2.9E+04	--	--	na	2.9E+04	--	--	--	--	--	--	--	--	--	--	na	2.9E+04
Fluoranthene	0	--	--	na	3.7E+02	--	--	na	3.7E+02	--	--	--	--	--	--	--	--	--	--	na	3.7E+02
Fluorene	0	--	--	na	1.4E+04	--	--	na	1.4E+04	--	--	--	--	--	--	--	--	--	--	na	1.4E+04
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	1.0E-02	na	--	--	--	--	--	--	--	--	--	--	1.0E-02	na	--
Heptachlor [c]	0	5.2E-01	3.8E-03	na	2.1E-03	5.2E-01	3.8E-03	na	2.1E-03	--	--	--	--	--	--	--	--	5.2E-01	3.8E-03	na	2.1E-03
Heptachlor Epoxide[c]	0	5.2E-01	3.8E-03	na	1.1E-03	5.2E-01	3.8E-03	na	1.1E-03	--	--	--	--	--	--	--	--	5.2E-01	3.8E-03	na	1.1E-03
Hexachlorobenzene[c]	0	--	--	na	7.7E-03	--	--	na	7.7E-03	--	--	--	--	--	--	--	--	--	--	na	7.7E-03
Hexachlorobutadiene[c]	0	--	--	na	5.0E+02	--	--	na	5.0E+02	--	--	--	--	--	--	--	--	--	--	na	5.0E+02
Hexachlorocyclohexane Alpha-BHC[c]	0	--	--	na	1.3E-01	--	--	na	1.3E-01	--	--	--	--	--	--	--	--	--	--	na	1.3E-01
Hexachlorocyclohexane Beta-BHC[c]	0	--	--	na	4.6E-01	--	--	na	4.6E-01	--	--	--	--	--	--	--	--	--	--	na	4.6E-01
Hexachlorocyclohexane Gamma-BHC[c] (Lindane)	0	9.5E-01	na	na	6.3E-01	9.5E-01	--	na	6.3E-01	--	--	--	--	--	--	--	--	9.5E-01	--	na	6.3E-01
Hexachlorocyclopentadiene	0	--	--	na	1.7E+04	--	--	na	1.7E+04	--	--	--	--	--	--	--	--	--	--	na	1.7E+04
Hexachloroethane[c]	0	--	--	na	8.9E+01	--	--	na	8.9E+01	--	--	--	--	--	--	--	--	--	--	na	8.9E+01
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	2.0E+00	na	--	--	--	--	--	--	--	--	--	--	2.0E+00	na	--
Indeno (1,2,3-cd) pyrene [c]	0	--	--	na	4.9E-01	--	--	na	4.9E-01	--	--	--	--	--	--	--	--	--	--	na	4.9E-01
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Isophorone[c]	0	--	--	na	2.6E+04	--	--	na	2.6E+04	--	--	--	--	--	--	--	--	--	--	na	2.6E+04
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Lead	0	2.5E+02	2.8E+01	na	--	2.5E+02	2.8E+01	na	--	--	--	--	--	--	--	--	--	2.5E+02	2.8E+01	na	--
Malathion	0	--	1.0E-01	na	--	--	1.0E-01	na	--	--	--	--	--	--	--	--	--	--	1.0E-01	na	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Mercury	0	1.4E+00	7.7E-01	na	5.1E-02	1.4E+00	7.7E-01	na	5.1E-02	--	--	--	--	--	--	--	--	1.4E+00	7.7E-01	na	5.1E-02
Methyl Bromide	0	--	--	na	4.0E+03	--	--	na	4.0E+03	--	--	--	--	--	--	--	--	--	--	na	4.0E+03
Methoxychlor	0	--	3.0E-02	na	--	--	3.0E-02	na	--	--	--	--	--	--	--	--	--	--	3.0E-02	na	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Monochlorobenzene	0	--	--	na	2.1E+04	--	--	na	2.1E+04	--	--	--	--	--	--	--	--	--	--	na	2.1E+04
Nickel	0	3.0E+02	3.3E+01	na	4.6E+03	3.0E+02	3.3E+01	na	4.6E+03	--	--	--	--	--	--	--	--	3.0E+02	3.3E+01	na	4.6E+03
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Nitrobenzene	0	--	--	na	1.9E+03	--	--	na	1.9E+03	--	--	--	--	--	--	--	--	--	--	na	1.9E+03
N-Nitrosodimethylamine[c]	0	--	--	na	8.1E+01	--	--	na	8.1E+01	--	--	--	--	--	--	--	--	--	--	na	8.1E+01
N-Nitrosodiphenylamine[c]	0	--	--	na	1.6E+02	--	--	na	1.6E+02	--	--	--	--	--	--	--	--	--	--	na	1.6E+02
N-Nitrosodi-n-propylamine[c]	0	--	--	na	1.4E+01	--	--	na	1.4E+01	--	--	--	--	--	--	--	--	--	--	na	1.4E+01
Parathion	0	6.5E-02	1.3E-02	na	--	6.5E-02	1.3E-02	na	--	--	--	--	--	--	--	--	--	6.5E-02	1.3E-02	na	--
PCB-1016	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	--	1.4E-02	na	--
PCB-1221	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	--	1.4E-02	na	--
PCB-1232	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	--	1.4E-02	na	--
PCB-1242	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	--	1.4E-02	na	--
PCB-1248	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	--	1.4E-02	na	--
PCB-1254	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	--	1.4E-02	na	--
PCB-1260	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	--	1.4E-02	na	--
PCB Total[c]	0	--	--	na	1.7E-03	--	--	na	1.7E-03	--	--	--	--	--	--	--	--	--	--	na	1.7E-03

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Pentachlorophenol [C]	0	4.8E+00	3.7E+00	na	8.2E+01	4.8E+00	3.7E+00	na	8.2E+01	--	--	--	--	--	--	--	--	**4.8E+00**	**3.7E+00**	**na**	**8.2E+01**
Phenol	0	--	--	na	4.6E+06	--	--	na	4.6E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.6E+06**
Pyrene	0	--	--	na	1.1E+04	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.1E+04**
Radionuclides (pCi/l except Beta/Photon)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Gross Alpha Activity	0	--	--	na	1.5E+01	--	--	na	1.5E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.5E+01**
Beta and Photon Activity (mrem/yr)	0	--	--	na	4.0E+00	--	--	na	4.0E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.0E+00**
Strontium-90	0	--	--	na	8.0E+00	--	--	na	8.0E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.0E+00**
Tritium	0	--	--	na	2.0E+04	--	--	na	2.0E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.0E+04**
Selenium	0	2.0E+01	5.0E+00	na	1.1E+04	2.0E+01	5.0E+00	na	1.1E+04	--	--	--	--	--	--	--	--	**2.0E+01**	**5.0E+00**	**na**	**1.1E+04**
Silver	0	9.2E+00	--	na	--	9.2E+00	--	na	--	--	--	--	--	--	--	--	--	**9.2E+00**	**--**	**na**	**--**
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
1,1,2,2-Tetrachloroethane[C]	0	--	--	na	1.1E+02	--	--	na	1.1E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.1E+02**
Tetrachloroethylene[C]	0	--	--	na	8.9E+01	--	--	na	8.9E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.9E+01**
Thallium	0	--	--	na	6.3E+00	--	--	na	6.3E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.3E+00**
Toluene	0	--	--	na	2.0E+05	--	--	na	2.0E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.0E+05**
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Toxaphene [C]	0	7.3E-01	2.0E-04	na	7.5E-03	7.3E-01	2.0E-04	na	7.5E-03	--	--	--	--	--	--	--	--	**7.3E-01**	**2.0E-04**	**na**	**7.5E-03**
Tributyltin	0	4.6E-01	6.3E-02	na	--	4.6E-01	6.3E-02	na	--	--	--	--	--	--	--	--	--	**4.6E-01**	**6.3E-02**	**na**	**--**
1,2,4-Trichlorobenzene	0	--	--	na	9.4E+02	--	--	na	9.4E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**9.4E+02**
1,1,2-Trichloroethane[C]	0	--	--	na	4.2E+02	--	--	na	4.2E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.2E+02**
Trichloroethylene [C]	0	--	--	na	8.1E+02	--	--	na	8.1E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.1E+02**
2,4,6-Trichlorophenol [C]	0	--	--	na	6.5E+01	--	--	na	6.5E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.5E+01**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Vinyl Chloride[C]	0	--	--	na	6.1E+01	--	--	na	6.1E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.1E+01**
Zinc	0	1.9E+02	1.9E+02	na	6.9E+04	1.9E+02	1.9E+02	na	6.9E+04	--	--	--	--	--	--	--	--	**1.9E+02**	**1.9E+02**	**na**	**6.9E+04**

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
   Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens, Harmonic Mean for Carcinogens, and Annual Average for Dioxin. Mixing ratios may be substituted for stream flows where appropriate.

Metal	Target Value (SSTV)
Antimony	4.3E+03
Arsenic	9.0E+01
Barium	na
Cadmium	1.1E+00
Chromium III	7.1E+01
Chromium VI	6.4E+00
Copper	8.8E+00
Iron	na
Lead	1.7E+01
Manganese	na
Mercury	5.1E-02
Nickel	2.0E+01
Selenium	3.0E+00
Silver	3.7E+00
Zinc	7.6E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

40.000 MGD DISCHARGE FLOW - STREAM MIX PER "Mix.exe"

Discharge Flow Used for WQS-WLA Calculations (MGI 40.000

	Stream Flows Allocated to Mix (MGD)		Total Mix Flows Stream + Discharge (MGD)	
	Dry Season	Wet Season	Dry Season	Wet Season
1Q10	0.000	0.000	40.000	40.000
7Q10	0.000	N/A	40.000	N/A
30Q10	0.000	0.000	40.000	40.000
30Q5	0.000	N/A	40.000	N/A
Harm. Mean	0.000	N/A	40.000	N/A
Annual Avg.	0.000	N/A	40.000	N/A

Stream/Discharge Mix Values

	Dry Season	Wet Season
1Q10 90th% Temp. Mix (deg C)	27.600	21.700
30Q10 90th% Temp. Mix (deg C)	27.600	21.700
1Q10 90th% pH Mix (SU)	7.000	7.000
30Q10 90th% pH Mix (SU)	7.000	7.000
1Q10 10th% pH Mix (SU)	6.400	N/A
7Q10 10th% pH Mix (SU)	6.400	N/A

	Calculated	Formula Inputs
1Q10 Hardness (mg/L as CaCO3)	177.0	177.0
7Q10 Hardness (mg/L as CaCO3)	177.0	177.0

Ammonia - Dry Season - Acute

90th Percentile pH (SU)	7.000
(7.204 - pH)	0.204
(pH - 7.204)	-0.204
Trout Present Criterion (mg N/I	24.103
Trout Absent Criterion (mg N/L	36.093
Trout Present?	n
Effective Criterion (mg N/L)	36.093

Ammonia - Dry Season - Chronic

90th Percentile Temp. (deg C)	27.600
90th Percentile pH (SU)	7.000
MIN	1.226
MAX	27.600
(7.688 - pH)	0.688
(pH - 7.688)	-0.688
Early LS Present Criterion (mg N	2.543
Early LS Absent Criterion (mg N/	2.543
Early Life Stages Present?	y
Effective Criterion (mg N/L)	2.543

Ammonia - Wet Season - Acute

90th Percentile pH (SU)	7.000
(7.204 - pH)	0.204
(pH - 7.204)	-0.204
Trout Present Criterion (mg N/I	24.103
Trout Absent Criterion (mg N/L	36.093
Trout Present?	n
Effective Criterion (mg N/L)	36.093

Ammonia - Wet Season - Chronic

90th Percentile Temp. (deg C)	21.700
90th Percentile pH (SU)	7.000
MIN	1.794
MAX	21.700
(7.688 - pH)	0.688
(pH - 7.688)	-0.688
Early LS Present Criterion (mg N	3.719
Early LS Absent Criterion (mg N/	3.719
Early Life Stages Present?	y
Effective Criterion (mg N/L)	3.719

40.000 MGD DISCHARGE FLOW - COMPLETE STREAM MIX

Discharge Flow Used for WQS-WLA Calculations (MGI 40.000

	100% Stream Flows Allocated to Mix (MGD)		Total Mix Flows Stream + Discharge (MGD)	
	Dry Season	Wet Season	Dry Season	Wet Season
1Q10	0.000	0.000	40.000	40.000
7Q10	0.000	N/A	40.000	N/A
30Q10	0.000	0.000	40.000	40.000
30Q5	0.000	N/A	40.000	N/A
Harm. Mean	0.000	N/A	40.000	N/A
Annual Avg.	0.000	N/A	40.000	N/A

Stream/Discharge Mix Values

	Dry Season	Wet Season
1Q10 90th% Temp. Mix (deg C)	27.600	21.700
30Q10 90th% Temp. Mix (deg C)	27.600	21.700
1Q10 90th% pH Mix (SU)	7.000	7.000
30Q10 90th% pH Mix (SU)	7.000	7.000
1Q10 10th% pH Mix (SU)	6.400	N/A
7Q10 10th% pH Mix (SU)	6.400	N/A

	Calculated	Formula Inputs
1Q10 Hardness (mg/L as CaCO3) =	177.000	177.000
7Q10 Hardness (mg/L as CaCO3) =	177.000	177.000

Ammonia - Dry Season - Acute

90th Percentile pH (SU)	7.000
(7.204 - pH)	0.204
(pH - 7.204)	-0.204
Trout Present Criterion (mg N/I	24.103
Trout Absent Criterion (mg N/L	36.093
Trout Present?	n
Effective Criterion (mg N/L)	36.093

Ammonia - Dry Season - Chronic

90th Percentile Temp. (deg C)	27.600
90th Percentile pH (SU)	7.000
MIN	1.226
MAX	27.600
(7.688 - pH)	0.688
(pH - 7.688)	-0.688
Early LS Present Criterion (mg N	2.543
Early LS Absent Criterion (mg N/	2.543
Early Life Stages Present?	y
Effective Criterion (mg N/L)	2.543

Ammonia - Wet Season - Acute

90th Percentile pH (SU)	7.000
(7.204 - pH)	0.204
(pH - 7.204)	-0.204
Trout Present Criterion (mg N/I	24.103
Trout Absent Criterion (mg N/L	36.093
Trout Present?	n
Effective Criterion (mg N/L)	36.093

Ammonia - Wet Season - Chronic

90th Percentile Temp. (deg C)	21.700
90th Percentile pH (SU)	7.000
MIN	1.794
MAX	21.700
(7.688 - pH)	0.688
(pH - 7.688)	-0.688
Early LS Present Criterion (mg N	3.719
Early LS Absent Criterion (mg N/	3.719
Early Life Stages Present?	y
Effective Criterion (mg N/L)	3.719

The Department of Health, Water Quality Division has developed this **User Friendly Version** of the Water Quality Standards for surface water, amended in 2002 and approved by the Environmental Protection Agency on January 24, 2003. This **User Friendly Version** merges the recent amendments to the regulations for water quality standards for surface water, published as final rulemaking in the D.C. Register at 49 DCR 3012 with the corrections made to the amendments at 49 DCR 4854, prior to publication in the District of Columbia Municipal Regulations (DCMR). Defined words and terms are bolded in the text to alert the reader to the fact that there is a specific meaning assigned to those words and terms, and that the meaning of a provision is to be interpreted in the defined context. Regulations pertaining to Ground Water have been omitted and are available in the official DCMR and D.C. Register.

Disclaimer

This **User Friendly Version** should not be relied upon as the definitive authority for the Water Quality Standards. Additionally, the formatting and pagination of the document may vary from the formatting and pagination of the official print edition. The official DCMR and the D.C. Register should be consulted prior to citing any provisions of the regulations as a reference. **The only official version of the DCMR is certified and published by the District of Columbia Office of Documents and Administrative Issuances.**

The official copy of the DC Municipal Regulations and Register can be purchased from the Office of Documents and Administrative Issuances. To order single copies of the DCMR, visit the Office of the Secretary website or contact:

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The DCMR is also available for viewing at the Martin Luther King Jr. Library and some branch libraries.

PREFACE

The Director of the District of Columbia Department of Health, pursuant to the authority set forth in sections 5 and 21 of the Water Pollution Control Act of 1984, effective March 16, 1985 (D.C. Law 5-188; D.C. Official Code §§ 8-103.04 and 8-103.20), and Mayor's Order 98-50, April 15, 1998, adopted amendments to the water quality standards, Chapter 11 of Title 21 of the District of Columbia Municipal Regulations (DCMR).

The rules promulgated on April 5, 2002 in the District of Columbia Register (DCR), at 49 DCR 3012, were previously published as proposed rules in the DCR on October 12, 2001, at 48 DCR 9483 and as emergency and proposed rules on February 22, 2002 at 49 DCR 1706. The final rulemaking made typographical and clarification corrections, added a new §1104.5 to prohibit streams from being placed in pipes, amended §1104.7 to include the new numeric criteria for Secchi Depth, Chlorophyll a, Arsenic, and Ammonia, and amended §1105.5 to specify the applicability of the numeric criteria for water clarity and Chlorophyll a.

The rules promulgated on May 24, 2002, at 49 DCR 4854, were previously published on May 3, 2002, at 49 DCR 4102. The final rulemaking corrected typographical errors in §1105.5, clarified wording in §1105.9, and re-established definitions in §1199.1 that pertain to groundwater standards that were inadvertently omitted from the final rulemaking published April 5, 2002, at 49 DCR 3012.

On September 13, 2002, the District of Columbia Department of Health submitted the Water Quality Standards for surface water to the Environmental Protection Agency (EPA) for their review and approval in accordance with 40 CFR 131.6. On November 27, 2002, the Department of Health submitted additional responses to EPA comments. Effective January 24, 2003, EPA approved the revised provisions of the District of Columbia's Water Quality Standards for surface water in accordance with Section 303(c) of the CWA and 40 CFR Part 131.

CHAPTER 11. WATER QUALITY STANDARDS

Secs.

1100 PURPOSE AND SCOPE

1100.1 This chapter establishes the revised Water Quality Standards (WQS) for the **waters of the District** of Columbia, as authorized by section 5 of the Water Pollution Control Act of 1984, effective March 16, 1985 (D.C. Law 5-188; D.C. Official Code § 8-103.01 *et seq.*).

AUTHORITY: Unless otherwise noted, the authority for this chapter is §5 of the Water Pollution Control Act of 1984, D.C. Law 5-188, D.C. Official Code § 8-103 (formerly codified at D.C. Code §6-924 (1988 Repl. Vol.)) (2001 Vol.), and Mayor's Order 98-50, April 15, 1998.

SOURCE: Final Rulemaking published at 40 DCR 4203, 4210 (July 2, 1993); and renumbered by Final Rulemaking published at 41 DCR 1075 (March 4, 1994); as amended by Final Rulemaking published at 47 DCR 284 (January 21, 2000); and by Final Rulemaking published at 49 DCR 3012 (April 5, 2002).

1101 SURFACE WATERS

1101.1 For the purposes of water quality **standards**, the **surface waters** of the District shall be classified on the basis of their (i) **current uses**, and (ii) future uses to which the waters will be restored. The categories of beneficial uses for the **surface waters** of the District shall be as follows:

Categories of Uses That Determine Water Quality **Standards**	Classes of Water
Primary contact recreation	A
Secondary contact recreation and aesthetic enjoyment	B
Protection & propagation of fish, shellfish and wildlife	C
Protection of human health related to consumption of fish & shellfish	D
Navigation	E

1101.2 The **surface waters** of the District are designated for beneficial use classes according to the categories delineated in subsection 1101.1 as follows:

CLASSIFICATION OF THE DISTRICT'S WATERS

	USE CLASSES	
Surface waters of the District	**Current Use**	**Designated Use**
Potomac River	B, C, D, E	A, B, C, D, E
Potomac River tributaries (except as listed below)	B, C, D	A, B, C, D
Battery Kemble Creek	B, C, D	A, B, C, D
C & O Canal	B, C, D, E	A, B, C, D, E
Rock Creek and its tributaries	B, C, D, E	A, B, C, D, E
Tidal Basin	B, C, D, E	A, B, C, D, E
Washington Ship Channel	B, C, D, E	A, B, C, D, E
Oxon Run	B, C, D	A, B, C, D
Anacostia River	B, C, D, E	A, B, C, D, E
Anacostia River tributaries (except as listed below)	B, C, D	A, B, C, D
Hickey Run	B, C, D	B, C, D
Watts Branch	B, C, D	B, C, D
Wetland	C, D	C, D

1101.3 The Director may remove a **designated use**, establish a partial use, or establish sub-categories of a use for a particular surface water segment or body if a use attainability analysis can demonstrate that attaining the **designated use** is not feasible because:

(a) Naturally occurring **pollutant** concentrations prevent the attainment of the use;

(b) Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating the District's water conservation requirements to enable uses to be met;

(c) Human caused conditions or sources of **pollution** prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place;

(d) Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or, to operate the modification in a way that would result in the attainment of the use;

(e) Physical conditions related to the natural features of the water body, such as the lack of proper substrate, cover, flow, depth, pools, riffles, and the like unrelated to water quality, preclude attainment of aquatic life protection uses; or

(f) Controls more stringent than those required by sections 301(b) and 306 of the Federal Clean Water Act would result in substantial and widespread economic and social impact.

1101.4 A **designated use** specified in section 1101 may not be removed and a partial use, that involves the removal of the **designated use**, may not be established if:

(a) The use is actually attained in the surface water segment or body on or after November 28, 1975, unless a use requiring more stringent **criteria** is added, or

(b) The uses will be attained by implementing effluent limits required under sections 301(b) and 306 of the Federal Clean Water Act and by implementing cost-effective and reasonable best management practices for **nonpoint source** control.

1101.5 If a permittee requests the Director to conduct a use attainability analysis and provides a reasonable basis for the need, the Director shall:

(a) Conduct a public meeting in the watershed of the affected segment or water body to inform the public of the nature of the use change requested and the basis of the request and solicit the opinions and views of the public prior to determining whether to conduct a use attainability analysis;

(b) Inform the permittee and the public of the decision;

(c) Inform the permittee of the approximate costs of the analysis and the schedule and the permittee shall provide payment as specified by the Director for the analysis;

(d) Not allow the permittee to perform the analysis;

(e) Form an advisory group of citizens and affected parties who will meet periodically during the course of the study;

(f) Hold a public hearing concerning the preliminary finding of the use attainability analysis prior to concluding the study;

(g) Submit the analysis to the **EPA** for review and approval, if it is determined that a modification or change in the uses of the segment or water body is justified; and

(h) Modify or remove the use in accordance with federal and District procedures for revising water quality **standards** upon receipt of approval by the **EPA**.

SOURCE: Final Rulemaking published at 40 DCR 4203, 4210 (July 2, 1993); and renumbered by Final Rulemaking published at 41 DCR 1075 (March 4, 1994); as amended by Final Rulemaking published at 47 DCR 284 (January 21, 2000; and by Final Rulemaking published at 49 DCR 3012 (April 5, 2002).

1102 ANTIDEGRADATION POLICY

1102.1 **TIER I**: Existing instream water uses and the level of water quality necessary to protect the **existing uses** shall be maintained and protected.

1102.2 **TIER II**: If the water quality of the **surface waters** of the District exceeds the water quality **criteria** necessary to sustain the **existing uses**, those waters shall be maintained at that quality. The water quality will not be allowed to degrade unless the District finds, after full satisfaction of the intergovernmental coordination and public participation, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located. In allowing the degradation to lower water quality, the District shall ensure water quality adequate to protect **existing uses** fully. Further, the District shall ensure that the highest statutory and regulatory requirements for all new and existing **point sources** and all cost effective and reasonable best management practices for **nonpoint source** control.

1102.3 **TIER III**: Where **High Quality Waters** constitute an outstanding national resource, such as waters of the national and District parks and wildlife refuges and waters of exceptional recreational or ecological significance, those waters shall be designated Outstanding National Resource Waters (ONRW) and the water quality in the ONRW shall be maintained, protected and designated as below:

(a) New point and **nonpoint source** discharges, treated or otherwise, shall be prohibited in these segments;

(b) Increases in **loadings** or new **pollutants** from existing point and **nonpoint source** discharges shall be prohibited in these segments;

(c) Short-term degradation of the water quality shall be allowed after opportunity for public participation and addressing their comments, if any. However, all practical means of minimizing the degradation shall be implemented; and

(d) Designation of ONRWs shall be adopted after full satisfaction of the intergovernmental coordination of the District's agencies and public participation.

1102.4 **SPECIAL WATERS OF THE DISTRICT OF COLUMBIA (SWDC)**: Any segment or segments of the **surface waters** of the District that are of water quality better than needed for the **current use** or have scenic or aesthetic importance shall be designated as Special Waters of the District of Columbia (SWDC). The water quality in SWDC designated segments of the District's **surface waters** shall be maintained at or above the current level by implementing the following:

(a) Existing **nonpoint source** discharges, storm water discharges and storm sewer discharges to SWDC segments shall be controlled through implementation of best management practices and regulatory programs;

(b) Construction or development projects, such as roads, bridges, and bank stabilization of the streams in which a SWDC designated segment is located, which may lead to **pollution** of the water, shall be permitted on a case-by-case basis to ensure that there are no long-term adverse water quality effects and that no impairment of the **designated uses** of the segment occurs; or

(c) Short term degradation of water quality in a SWDC segment due to construction projects may be permitted provided that prior notice is given to the public and other local and federal government agencies and provided that the builder of the construction project addresses the concerns of the public and local and federal government agencies.

1102.5 The following **waters of the District** shall be the designated as SWDC segments:

(a) Rock Creek and its tributaries, and

(b) Battery Kemble Creek and its tributaries.

SOURCE: Final Rulemaking published at 40 DCR 4203, 4210 (July 2, 1993); and renumbered by Final Rulemaking published at 41 DCR 1075 (March 4, 1994); as amended by Final Rulemaking published at 47 DCR 284 (January 21, 2000); and by Final Rulemaking published at 49 DCR 3012 (April 5, 2002).

1103 WETLANDS

1103.1 In a **wetland**, the numerical and the **narrative criteria** shall be applied to the column of water above the **wetland** in accordance with the **designated use**.

1103.2 **Wetlands** with rooted vascular aquatic vegetation, except those specifically constructed or created as waste water treatment devices and except as provided in D.C. Official Code § 8-103.03(d) and D.C. Official Code § 8-103.06(a)(3), shall be protected from significant adverse hydrologic modifications, excessive sedimentation, deposition of **toxic substances** in toxic amounts, nutrient imbalances, and other adverse anthropogenic impacts.

SOURCE: Final Rulemaking published at 40 DCR 4203, 4210 (July 2, 1993); and renumbered by Final Rulemaking published at 41 DCR 1075 (March 4, 1994); as amended by Final Rulemaking published at 47 DCR 284 (January 21, 2000); and by Final Rulemaking published at 49 DCR 3012 (April 5, 2002).

1104 STANDARDS

1104.1 The **surface waters** of the District shall be free from substances in amounts or combinations that do any one of the following:

(a) Settle to form objectionable deposits;

(b) Float as debris, scum, oil, or other matter to form nuisances;

(c) Produce objectionable odor, color, taste, or turbidity;

(d) Cause injury to, are toxic to, or produce adverse physiological or behavioral changes in humans, plants, or animals;

(e) Produce undesirable or nuisance aquatic life or result in the dominance of nuisance species; or

(f) Impair the biological community that naturally occurs in the waters or depends on the waters for its survival and propagation.

1104.2 For the **waters of the District** with multiple **designated uses**, the most stringent **standards** or **criteria** shall govern.

1104.3 Class A waters shall be free of discharges of untreated sewage, litter and unmarked, submerged or partially submerged, man-made structures that would constitute a hazard to the users.

1104.4 The aesthetic qualities of Class B waters shall be maintained. Construction, placement or mooring of facilities not primarily and directly water oriented is prohibited in, on or over Class B waters unless:

(a) The facility is for the general public benefit and service, and

(b) Land based alternatives are not available.

1104.5 Class C streams shall be maintained to support aquatic life and shall not be placed in pipes.

1104.6 Class E waters shall be free of unmarked submerged or partially submerged man-made objects that pose a hazard to users of these waters.

1104.7 Unless otherwise stated, the numeric **criteria** that shall be met to attain and maintain **designated uses** are as follows (Tables 1 through 3):

Table 1

Constituent	Criteria for Classes A	B	C
Bacteriological (No./100 mL)			
Fecal coliform (Maximum 30 day geometric mean for 5 samples)	200	1000	
Physical			
Dissolved oxygen (mg/L)			
Minimum daily average (3 samples per 24 hours Once per 8 hour)			5.0
One hour minimum			
March through June			5.0
July through February			4.0
Temperature (°C)			
Maximum			32.2
Maximum change above **ambient**			2.8
PH			
Greater than	6.0	6.0	6.0
And less than	8.5	8.5	8.5
Turbidity increase above **ambient** (NTU)	20	20	20
Secchi Depth (m)(seasonal segment average) [Note 1]			
April through October			0.8
Total dissolved gases (maximum % saturation)			110
Hydrogen sulfide (maximum ((μg /L)			2.0
Oil & grease (mg/L)			10.0
Biological			
Chlorophyll a			
Concentration ((μg/L)(seasonal segment average) [Note 1]			
July through September			25

Notes:

[Note 1] Shall apply to the tidal Anacostia River only and will be calculated as the seasonal average.

Table 2

Constituent	Criteria for Classes		
	C		D
	CCC	CMC	
MAXIMUM VALUES FOR CLASS C, **CCC** (FOUR DAY AVERAGE), CLASS C, **CMC** (ONE HOUR AVERAGE) AND CLASS D (30 DAY AVERAGE)			
Trace metals and inorganics in mg/L, except where stated otherwise (see Notes below)			
Ammonia, total	[Note 6]	[Note 7]	
Antimony, dissolved			4.3
Arsenic, dissolved	0.15	0.34	0.00014[c]
Cadmium, dissolved	[I][CF]	[I.A][CF]	
Chlorine, total residual	0.011	0.019	
Chromium, hexavalent, Dissolved	0.011[CF]	0.016[CF]	
Chromium, trivalent, Dissolved	[II][CF]	[II.A][CF]	
Copper, dissolved	[III][CF]	[III.A][CF]	
Cyanide, free	0.0052	0.022	220.0
Iron, dissolved	1.0		
Lead, dissolved	[IV][CF]	[IV.A][CF]	
Mercury, total recoverable	0.000012	0.0024	0.00015
Nickel, dissolved	[V][CF]	[V.A][CF]	4.6
Selenium, total recoverable	0.005	0.02	
Silver, dissolved		[VI][CF]	65.0
Thallium, dissolved			0.0063
Zinc, dissolved	[VII][CF]	[VII.A][CF]	

Notes:

[Note 1] Superscript c means the criterion is based on carcinogenicity (10^{-6} risk). Superscript CF means the criterion is to be adjusted by using the conversion factors as specified in subsection 1105.10 of this Chapter.

[Note 2] **CCC** and **CMC** are defined in section 1199.

[Note 3] Human Health Criteria for metals will be based on Total Recoverable metals.

[Note 4] The formulas for calculating the concentrations of substances indicated above are as follows:

[I] The numerical **CCC** criterion for cadmium in µg/L shall be given by:

$$e^{(0.7852[\ln(\text{hardness})] - 3.490)}$$

[I.A] The numerical **CMC** criterion for cadmium in µg/L shall be given by:

$$e^{(1.128[\ln(\text{hardness})] - 3.828)}$$

[II] The numerical **CCC** criterion for trivalent chromium in µg/L shall be given by:

$$e^{(0.8190[\ln(\text{hardness})] + 1.561)}$$

[II.A] The numerical **CMC** criterion for trivalent chromium in µg/L shall be given by:

$$e^{(0.8190[\ln(\text{hardness})] + 3.688)}$$

[III] The numerical **CCC** criterion for copper in µg/L shall be given by:

$$e^{(0.8545[\ln(\text{hardness})] - 1.465)}$$

[III.A] The numerical **CMC** criterion for copper in µg/L shall be given by:

$$e^{(0.9422[\ln(\text{hardness})] - 1.464)}$$

[IV] The numerical **CCC** criterion for lead in µg/L shall be given by:

$$e^{(1.2730[\ln(\text{hardness})] - 4.705)}$$

[IV.A] The numerical **CMC** criterion for lead in µg/L shall be given by:

$$e^{(1.2730[\ln(\text{hardness})] - 1.460)}$$

[V] The numerical **CCC** criterion for nickel in µg/L shall be given by:

$$e^{(0.8460[\ln(\text{hardness})] + 1.1645)}$$

[V.A] The numerical **CMC** criterion for nickel in µg/L shall be given by:

$$e^{(0.8460[\ln(\text{hardness})] + 3.3612)}$$

[VI] The numerical **CMC** criterion for silver in µg/L shall be given by:

$$e^{(1.72[\ln(\text{hardness})] - 6.52)}$$

[VII] The numerical **CCC** criterion for zinc in µg/L shall be given by:

$$e^{(0.8473[\ln(\text{hardness})] + 0.7614)}$$

[VII.A] The numerical **CMC** criterion for zinc in µg/L shall be given by:

$$e^{(0.8473[\ln(\text{hardness})] + 0.8604)}$$

[Note 5] Hardness in the equations (I) through (VII.A) in [Note 4] above shall be measured as mg/L of $CaCO_3$. The minimum hardness allowed for use in those equations shall not be less than 25 mg/L, as $CaCO_3$, even if the actual **ambient** hardness is less than 25 mg/L as $CaCO_3$. The maximum hardness value allowed for use in those equations shall not exceed 400 mg/L, as $CaCO_3$, even if the actual **ambient** hardness is greater than 400 mg/L as $CaCO_3$.

[Note 6] The **CCC** criterion for ammonia shall be (i) thirty day average concentration for total ammonia, computed for a design flow specified in subsection 1105.5; and (ii) and shall account for the influence of the pH and temperature as shown in the following tables.

Total ammonia (in mg/L as ammonia) for various pH and temperatures for **CCC** for March through June:

	Temperature (°C)									
pH	0	14	16	18	20	22	24	26	28	30
6.50	6.67	6.67	6.06	5.33	4.68	4.12	3.62	3.18	2.80	2.46
6.60	6.57	6.57	5.97	5.25	4.61	4.05	3.56	3.13	2.75	2.42
6.70	6.44	6.44	5.86	5.15	4.52	3.98	3.42	3.00	2.64	2.32
6.80	6.29	6.29	5.72	5.03	4.42	3.89	3.42	3.00	2.64	2.32
6.90	6.12	6.12	5.56	4.89	4.30	3.78	3.32	2.92	2.57	2.25
7.00	5.91	5.91	5.37	4.72	4.15	3.65	3.21	2.82	2.48	2.18
7.10	5.67	5.67	5.15	4.53	3.98	3.50	3.08	2.70	2.38	2.09
7.20	5.39	5.39	4.90	4.31	3.78	3.33	2.92	2.57	2.26	1.99
7.30	5.08	5.08	4.61	4.06	3.57	3.13	2.76	2.42	2.13	1.87
7.40	4.73	4.73	4.30	3.97	3.49	3.06	2.69	2.37	2.08	1.83
7.50	4.36	4.36	3.97	3.49	3.06	2.69	2.37	2.08	1.83	1.61
7.60	3.98	3.98	3.61	3.18	2.79	2.45	2.16	1.90	1.67	1.47
7.70	3.58	3.58	3.25	2.86	2.51	2.21	1.94	1.71	1.50	1.32
7.80	3.18	3.18	2.89	2.54	2.23	1.96	1.73	1.52	1.33	1.17
7.90	2.80	2.80	2.54	2.24	1.96	1.73	1.52	1.33	1.17	1.03
8.00	2.43	2.43	2.21	1.94	1.71	1.50	1.32	1.16	1.02	0.897
8.10	2.10	2.10	1.91	1.68	1.47	1.29	1.14	1.00	0.879	0.773
8.20	1.79	1.79	1.63	1.43	1.26	1.11	0.973	0.855	0.752	0.661
8.30	1.52	1.52	1.39	1.22	1.07	0.941	0.827	0.727	0.639	0.562
8.40	1.29	1.29	1.17	1.03	0.906	0.796	0.700	0.615	0.541	0.475
8.50	1.09	1.09	0.990	0.870	0.765	0.672	0.591	0.520	0.457	0.401
8.60	0.920	0.920	0.836	0.735	0.646	0.568	0.499	0.439	0.386	0.339
8.70	0.778	0.778	0.707	0.622	0.547	0.480	0.422	0.371	0.326	0.287
8.80	0.661	0.661	0.601	0.528	0.464	0.408	0.359	0.315	0.277	0.208
8.90	0.565	0.565	0.513	0.451	0.397	0.349	0.306	0.269	0.237	0.208
9.00	0.486	0.486	0.442	0.389	0.342	0.300	0.264	0.232	0.204	0.179

Total ammonia (in mg/L as ammonia) for various pH and temperatures for **CCC** for July through February:

	Temperature (°C)									
pH	0-7	8	9	10	11	12	13	14	15*	16*
6.50	10.8	10.1	9.51	8.92	8.36	7.84	7.35	6.89	6.46	6.06
6.60	10.7	9.99	9.37	8.79	8.24	7.72	7.24	6.79	6.36	5.97
6.70	10.5	9.81	9.20	8.62	8.08	7.58	7.11	6.66	6.25	5.86
6.80	10.2	9.58	8.98	8.42	7.90	7.40	6.94	6.51	6.10	5.72
6.90	9.93	9.31	8.73	8.19	7.68	7.20	6.75	6.33	5.93	5.56
7.00	9.60	9.00	8.43	7.91	7.41	6.95	6.52	6.11	5.73	5.37
7.10	9.20	8.63	8.09	7.58	7.11	6.67	6.25	5.86	5.49	5.15
7.20	8.75	8.20	7.69	7.21	6.76	6.34	5.94	5.57	5.22	4.90
7.30	8.24	7.73	7.25	6.79	6.37	5.97	5.60	5.25	4.92	4.61
7.40	7.69	7.21	6.76	6.33	5.94	5.57	5.22	4.89	4.59	4.30
7.50	7.09	6.64	6.23	5.84	5.48	5.13	4.81	4.51	4.23	3.97
7.60	6.46	6.05	5.67	5.32	4.99	4.68	4.38	4.11	3.85	3.61
7.70	5.81	5.45	5.11	4.79	4.49	4.21	3.95	3.70	3.47	3.25
7.80	5.17	4.84	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89
7.90	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89	2.71	2.54
8.00	3.95	3.70	3.47	3.26	3.05	2.86	2.68	2.52	2.36	2.21
8.10	3.41	3.19	2.99	2.81	2.63	2.47	2.31	2.17	2.03	1.91
8.20	2.91	2.73	2.56	2.4	2.25	2.11	1.98	1.85	1.74	1.63
8.30	2.47	2.32	2.18	2.04	1.91	1.79	1.68	1.58	1.48	1.39
8.40	2.09	1.96	1.84	1.73	1.62	1.52	1.42	1.33	1.25	1.17
8.50	1.77	1.66	1.55	1.46	1.37	1.28	1.20	1.13	1.06	0.990
8.60	1.49	1.40	1.31	1.23	1.15	1.08	1.01	0.951	0.892	0.836
8.70	1.26	1.18	1.11	1.04	0.976	0.915	0.858	0.805	0.754	0.707
8.80	1.07	1.01	0.944	0.885	0.829	0.778	0.729	0.684	0.641	0.601
8.90	0.917	0.860	0.806	0.756	0.709	0.664	0.623	0.584	0.548	0.513
9.00	0.790	0.740	0.694	0.651	0.610	0.572	0.536	0.503	0.471	0.442

*At 15°C and above, the criterion for July through February is the same as the criterion for March through June.

[Note 7] The **CMC** criterion for total ammonia shall be (i) the one (1)-hour average concentration for total ammonia, computed for a design flow specified in subsection 1105.5; and (ii) account for the influence of the pH as shown in the following table.

Total ammonia (in mg/L as ammonia) for various pH for **CMC**:

PH	**CMC**	pH	**CMC**	PH	**CMC**
6.50	48.8	7.40	23.0	8.30	4.71
6.60	46.8	7.50	19.9	8.40	3.88
6.70	44.6	7.60	17.0	8.50	3.20
6.80	42.0	7.70	14.4	8.60	2.65
6.90	39.1	7.80	12.1	8.70	2.20
7.00	36.1	7.90	10.1	8.80	1.84
7.10	32.8	8.00	8.40	8.90	1.56
7.20	29.5	8.10	6.95	9.00	1.32
7.30	26.2	8.20	5.72		

Table 3

Constituent (Chemical Abstracts Service Registry Number)	**Criteria** for Classes C		D
	CCC	**CMC**	
Organics (in μg/L):			
Acrolein (107028)	10.0		780
Acrylonitrile (107131)	700.0		0.66,c
Aldrin (309002)	0.4	3.0	0.00014,c
Benzene (71432)	1000		71.0,c
Carbon tetrachloride (56235)	1000		4.4,c
Chlordane (57749)	0.004	2.4	0.00059,c
Chlorinated benzenes (except Di)	25.0		
Chlorobenzene (108907)			21,000
1,2-Dichlorobenzene (95501)	200		17,000
1,3-Dichlorobenzene (541731)	200		2,600
1,4-Dichlorobenzene (106467)	200		2,600
Hexachlorobenzene (118741)			0.00077,c
Chlorinated ethanes	50		
1,2-Dichloroethane (107062)			99.0,c
1,1,2,2-Tetra-chloroethane (79345)			11.0,c

1,1,1-Trichloroethane (71556)			
1,1,2-Trichloroethane (79005)			42.0,c
Hexachloroethane (67721)			8.9,c
Chlorinated naphthalene			
2-Chloronaphthalene (91587)	200		
Chlorinated phenols			
2-chlorophenol (95578)	100		
2,4-dichlorophenol (120832)	200		790.0
2,4,6-trichlorophenol (88062)			6.5,c
Pentachlorophenol (87865)	[I]	[I.A]	8.2,c
Chloroalkyl ethers	1000		
Bis(2-Chloroethyl)ether (111444)			1.4,c
Bis(2-Chloroisopropyl) ether (108601)			170,000
DDT or isomers (50293, 72559 or 72548)	0.001	1.1	0.00059,c
3,3-Dichlorobenzidine (91941)	10		0.077,c
Dichloroethylenes	1000		
1,1-Dichloroethylene (75354)			3.2,c
1,2-Trans-Dichloro-ethylene(156605)			
1,2-Dichloropropane (78875)	2000		
Dichloropropenes	400		
1,3-Dichloropropylene (542756)			1,700
Dieldrin (60571)	0.0019	2.5	0.00014,c
2,4-Dimethylphenol (105679)	200		
2,4-Dinitrotoluene (121142)	33		9.1,c
Dioxin(2,3,7,8-TCDD) (1746016)			0.000000014,c
1,2-Diphenylhydrazine (122667)	30		0.54,c
Endosulfan (959988 or 33213659)	0.056	0.22	2.0
Endosulfan sulfate (1031078)			2.0
Endrin (72208)	0.0023	0.18	0.81
Endrin aldehyde (7421934)			0.81
Ethylbenzene (100414)	40		29,000
Halomethanes	1000		
Bromoform (75252)			360.0,c
Chloroform (67663)	3000		470.0,c
Methyl bromide (74839)			4,000

Methyl chloride (74873)			
Methylene chloride (75092)			1,600,c
Chlorodibromomethane (124481)			34.0,c
Dichlorobromomethane (75274)			22.0,c
Heptachlor (76448)	0.0038	0.52	0.00021,c
Heptachlor epoxide (1024573)	0.0038	0.52	0.00011,c
Hexachlorobutadiene (87683)	10		50.0,c
Hexachlorocyclohexane			
Alpha-BHC (319846)			0.013,c
Beta-BHC (319857)			0.046,c
Gamma-BHC (58899)	0.08	2.0	0.063,c
Hexachloro-			
cyclopentadiene (77474)	0.5		17,000
Isophorone (78591)	1000		600.0,c
Naphthalene (91203)	600		
Nitrobenzene (98953)	1000		1,900
Nitrophenols	20		
2-Methyl-4,6-			765
Dinitrophenol (534521)			
2,4-Dinitrophenol (51285)			14,000
Nitrosamines	600		
N-Nitrosodi-			8.1,c
methylamine (62759)			
N-Nitrosodi-n-Propylamine			
(621647)			
N-Nitrosodi- phenylamine			16.0,c
(86306)			
Phenol (108952)			4,600,000
Phthalate esters	100		
Bis(2-Ethylhexyl)-			5.9,c
phthalate (117817)			
Butylbenzyl phthalate			
(85687)			
Diethyl phthalate (84662)			120,000
Dimethyl phthalate			2,900,000
(131113)			
Di-n-Butyl phthalate			12,000
(84742)			
Polychlorinated biphenyls	0.014		0.000045,c
Polynuclear aromatic			
Hydrocarbons			
Acenaphthene (83329)	50		
Acenaphthylene (208968)			
Anthracene (120127)			110,000
Benzidine (92875)	250		0.00054,c
Benzo(a)Anthracene			0.031,c

(56553)			
Benzo(a)Pyrene (50328)			0.031,c
Benzo(b)Fluoranthene			0.031,c
(205992)			
Benzo(k)Fluoranthene			0.031,c
(207089)			
Chrysene (218019)			0.031,c
Dibenzo(a,h)-			0.031,c
Anthracene (53703)			
Fluoranthene (206440)	400		370.0
Fluorene (86737)			14,000
Indeno(1,2,3-cd)-			0.031,c
Pyrene (193395)			
Phenanthrene (85018)			
Pyrene (129000)			11,000
Tetrachloroethylene (127184)	800		8.85,c
Toluene (108883)	600		200,000
Toxaphene (8001352)	0.0002	0.73	0.00075,c
Trichloroethylene (79016)	1000		81.0,c
Vinyl chloride (75014)			525.0,c

[Note 1] ,c After the Human Health Criteria numeric value means that the **criteria** is based on carcinogenicity (10^{-6}) risk level.

[Note 2] The formulas for calculating the concentrations of substances indicated above are as follows:

[I] The numerical **CCC** criterion for pentachlorophenol in µg/L shall be given by:

$$e^{(1.005(pH) - 5.290)}$$

[I.A] The numerical **CMC** criterion for pentachlorophenol in µg/L shall be given by:

$$e^{(1.005(pH) - 4.830)}$$

SOURCE: Final Rulemaking published at 40 DCR 4203, 4210 (July 2, 1993); and renumbered by Final Rulemaking published at 41 DCR 1075 (March 4, 1994); as amended by Final Rulemaking published at 47 DCR 284 (January 21, 2000); and by Final Rulemaking published at 49 DCR 3012 (April 5, 2002).

1105 IMPLEMENTATION AND APPLICABILITY

1105.1 Where the discharge of **pollutants** in quantities that prevent the attainment of, or violates, the surface water quality **standards** the Director may grant a variance from a WQS that is the basis of a water quality-based effluent limitation included in a National Pollutant Discharge Elimination System (NPDES) permit. A WQS variance applies only to the permittee requesting the variance and only to the **pollutant** or **pollutants** specified in the variance. A variance does not affect, or require the Director to modify, the corresponding water quality standard for the waterbody as a whole. A variance may be granted only if the discharger can justify every three (3) years through a public hearing process that attaining the WQS is not feasible because at least one (1) of the following conditions exists:

(a) Irretrievable and irreversible conditions that prevent the attainment of the **standards**;

(b) The application of technology sufficient to attain the **standards** is more stringent than that required by sections 301(b) and 306 of the Federal Clean Water Act, and the application of the technology would result in substantial and widespread adverse economic and social impacts; or

(c) One or more of the reasons specified in 40 CFR § 131.10 (g).

1105.2 The Director shall not grant a temporary variance from water quality **standards** if:

(a) The variance will result in loss of protection for an **existing use**, or

(b) The permittee fails to make the demonstrations required under subsection 1105.1.

1105.3 Variances approved by the Director shall include all permit conditions needed to implement those parts of the variance so approved. The permit conditions shall, at a minimum, require:

(a) Compliance with an initial effluent limitation that, at the time the variance is granted, represents the level currently achievable by the permittee, and that is no less stringent than that achieved under the previous permit;

(b) That reasonable progress be made toward attaining the water quality **standards** for the waterbody as a whole through appropriate conditions; and

(c) A provision that allows the permitting authority to reopen and modify the permit based on any triennial water quality **standards** revisions to the variance.

1105.4 The Director shall establish and incorporate into the water quality certification of the permittee's discharge permit, all conditions needed to implement the variance as determined pursuant to this section. A variance may be renewed, subject to the requirements of this section. As part of any renewal application, the permittee shall again demonstrate that attaining WQS is not feasible based on the requirements of subsection 1105.1. The permittee's application shall also contain information concerning its compliance with the conditions incorporated into its permit as part of the previous variance pursuant to this section. The Director may deny renewal of a variance if the permittee did not substantively comply with the conditions of the previous variance.

1105.5 The design flow to be used for establishing permit limitations for discharges to the District waters shall be as follows:

(a) The **numerical criteria** for classes A, B, and C(**CCC**), as delineated in subsection 1104.7, shall not apply at flows less than the average seven-day (7-day) low flow, which has a probability of occurrence of once in ten (10) years;

(b) The **numerical criteria** for class C(**CMC**), as delineated in subsection 1104.7, shall not apply at flows less than the average one-day (1-day) low flow, which has a probability of occurrence of once in ten (10) years; and

(c) For carcinogenic **pollutants** under class D, as delineated in subsection 1104.7, the design flow shall be the **harmonic mean flow**, and for noncarcinogenic **pollutants** under class D the design flow shall be the average thirty-day (30-day) low flow, which has the probability of occurrence of once in five (5) years. The categorization of **pollutants** to be carcinogenic or non carcinogenic is shown under the column of Human Health Criteria.

(d) The **numerical criteria** for clarity shall not apply at flows greater than the long-term seasonal average flow.

(e) For chlorophyll a the design flow shall be the average seasonal flow for July through September.

1105.6 High flow conditions in the District of Columbia waters are defined as below:

(a) For the Potomac River the following conditions shall be considered a high flow:

(i) A flow that may result due to a rainfall with an average intensity greater than two-tenths of an inch (0.2") per hour for a period of one (1) hour in the portion of the District of Columbia contributory to the Potomac River, or

(ii) A flow equivalent to a three hundred percent (300%) increase in flow during a twenty-four (24) hour period.

(b) For the Anacostia River the following conditions shall be considered a high flow:

(i) A flow that may result due to a rainfall with an average intensity greater than two-tenths of an inch (0.2") per hour for a period of one (1) hour in the portion of the District of Columbia contributory to the Anacostia River, or

(ii) A flow equivalent to a three hundred percent (300%) increase in flow during a twenty-four (24) hour period.

(c) For Rock Creek and tributaries the following conditions shall be considered a high flow:

(i) A flow that may result due to a rainfall with an average intensity greater than two-tenths of an inch (0.2") per hour for a period of one (1) hour in the portion of the District of Columbia contributory to Rock Creek, or

(ii) A flow equivalent to a three hundred percent (300%) increase in flow during a twenty-four (24) hour period.

d) For other tributaries to the Potomac and Anacostia Rivers a flow equivalent to a five hundred percent (500%) increase in flow during a twenty-four (24) hour period, shall be considered a high flow.

1105.7 **Mixing zones** may be allowed for **point source** discharges of **pollutants** on a case-by-case basis, where it is demonstrated that allowing a small area impact will not adversely affect the waterbody as a whole. The following conditions shall apply:

(a) In the nontidal waters the permissible size of the **mixing zone** shall be determined by the ability of organisms to pass through the **mixing zone** and the size of the receiving water body;

(b) **Mixing zones** shall be free from discharged substances that will settle to form objectionable deposits; float to form unsightly masses; or produce objectionable color, odor, or turbidity;

(c) A **mixing zone**, or two (2) or more **mixing zones**, shall not form a barrier to the movements of aquatic life nor cause significant adverse impact on aquatic life in shallow areas that serve as a nursery;

(d) The concentration of a substance in the **mixing zone** shall not be lethal to passing organisms, as determined by the appropriate **EPA** method;

(e) **Mixing zones** shall be positioned in a manner that provides the greatest protection to aquatic life and the **designated uses** of the water;

(f) Within the estuary, the cross-sectional area occupied by a **mixing zone** shall not exceed ten percent (10%) of the numerical value of the cross-sectional area of the waterway, and the width of the **mixing zone** shall not occupy more than one third (1/3) of the width of the waterway;

(g) Within the estuary, **mixing zones** may move with the prevailing hydraulic and meteorological conditions;

(h) The numerical **standards** for Criteria Continuous Concentration (**CCC**) in subsection 1104.7 must be met at the edge of the **mixing zone** and therefore the **CMC criteria** will be met within some portions of the **mixing zone**; and

(i) The **mixing zone** shall be sized by using the **EPA** guidance (Technical Support Document for Water Quality-Based Toxics Control (EPA/505/2-90-001), March 1991) and approved by the Director.

1105.8 Any permit issued pursuant to section 7 of the Water Pollution Control Act of 1984 (D.C. Official Code § 8-103.06) shall be based on the **designated uses** and other provisions of these water quality **standards**.

1105.9 When the Director requires a new water quality standard-based effluent limitation in a discharge permit, the permittee shall have no more than three (3) years to achieve compliance with the limitation, unless the permittee can demonstrate that a longer compliance period is warranted. A compliance schedule shall be included in the permit.

1105.10 For the purposes of specific effluent limits in permits, the **numerical criteria** for dissolved cadmium, hexavalent chromium, trivalent chromium, copper, lead, nickel, silver, and zinc shall be calculated by multiplying the **criteria** for these metals as specified in Table 2 of § 1104.7 by the **EPA** Conversion Factors specified in Table 2 at 60 Fed. Reg. 22,231 (1995). This conversion is required because the numerical values for these metals in Table 2 of this Chapter were established for total recoverable metals but are being used for dissolved metals.

SOURCE: Final Rulemaking published at 40 DCR 4203, 4210 (July 2, 1993); and renumbered by Final Rulemaking published at 41 DCR 1075 (March 4, 1994); as amended by Final Rulemaking published at 47 DCR 284 (January 21, 2000); by Final Rulemaking published at 49 DCR 3012 (April 5, 2002); and by Final Rulemaking published at 49 DCR 4854 (May 24, 2002).

1106 SITE SPECIFIC STANDARDS

1106.1 If requested, the Director may allow a site-specific study to change the **numerical criteria** when at least one (1) of the following conditions exists:

(a) The species, or endangered species, at the site are more or less sensitive than those included in the national **criteria** data set; or

(b) Physical or chemical characteristics of the site alter the biological availability or toxicity of the chemical.

1106.2 If the **criteria** in subsection 1104.7 are found to be unsuitable for the District waters based on the conditions described in 1106.1, when requested to do so, the Director may adopt site-specific **criteria** for Class C waters, except for mercury and selenium, or for Class D waters, only when a site-specific study necessitates.

1106.3 When requested to do so, based on the conditions described in subsection 1106.1 and if warranted, the Director shall allow site-specific studies to generate scientific information regarding:

(a) The **water effect ratio** for metals specific to the District waters;

(b) The sensitivities of the aquatic organisms prevalent in the District;

(c) The toxicity of chemicals to the fish in the District waters and related human health effects; and

(d) Any other compelling factors that merit consideration for changing the numerical **standards** in subsection 1104.7.

1106.4 A person or persons planning to conduct a site-specific study shall submit a complete plan of study to the Director for approval, and the site-specific study shall be carried out only after the Director approves the study in writing, subject to the requirements set forth in section 1106.

1106.5 The Director shall provide advance notice to all discharge permittees and applicants for discharge permits prior to the initiation of any site-specific study.

1106.6 All site-specific studies and adoption of site-specific criteria shall be subject to the following requirements:

(a) Once the Director has approved the study, it shall be concluded in accordance with the approved plan;

(b) A person or persons conducting a site-specific study subject to subsection 1106.3 shall submit to the Director for review and approval all data, analyses, findings, reports and other information the Director deems necessary;

(c) The Director shall seek review of the findings of the site-specific studies and other relevant information by the public as well as by appropriate local and federal government agencies and consider their concerns before adopting any less stringent site-specific criterion based on those findings; and

(d) If the study concludes that a more stringent criterion is needed for Class C or D waters than provided in subsection 1104.7, then the standards shall be modified to reflect the more stringent level of protection.

1106.7 If a study is conducted to determine the **Water Effect Ratio (WER)** for metals and the criteria are in the dissolved form, the **WER** must be based on the dissolved fraction of the metals. If the study is conducted to determine the **WER** for metals and the **criteria** are in the total recoverable form, the **WER** must be based on the total recoverable fraction of the metals. If **WERs** are to be developed, EPA guidance Interim Guidance on Determination and Use of Water Effect Ratios for Metals, (EPA-823-B94-001, February 1994) shall be used and at a minimum, the following conditions shall be met unless the **Director** approves a deviation or alternate method:

(a) If a **WER** study concludes that an existing criterion is not stringent enough then the criterion shall be made more stringent;

(b) At least two (2) sensitive indicator species, a fish and at least one (1) invertebrate, shall be used to determine toxicity in laboratory water and water collected from the site;

(c) The $\mathbf{LC_{50}}$ in the laboratory water must be comparable to the $\mathbf{LC_{50}}$ data developed by EPA;

(d) Water samples collected from the site shall be representative of critical low flow. A minimum of eight (8) samples per location per season shall be evaluated;

(e) Samples shall be taken at the edge of the **mixing zone** unless multiple discharges are involved. At least one (1) sample shall be reasonably well mixed with the flow of the receiving water or the sample shall be well outside the regulatory **mixing zone**;

(f) Laboratory water shall be same as the water used by **EPA** and adjusted for site water characteristics and hardness;

(g) The trace metal shall be added in the form of a highly soluble inorganic salt;

(h) The chemical and physical characteristics, both dissolved and total recoverable metal concentrations, hardness, pH, alkalinity, suspended solids, organic carbon, temperature, and specific metal binding ligands (where known to be important) and any other water quality characteristic that affects bioavailability and toxicity of the water should be monitored during the toxicity tests;

(i) A **WER** that is large or that is based on highly variable tests may be rejected;

(j) The **WER** shall be the geometric mean of the two (2) species; and

(k) All chemical, biochemical, biological, and other appropriate analyses shall be conducted by EPA-approved methods.

1106.8 If a site-specific study is conducted to determine the Human Health Criteria and related human health effects, at a minimum, the following information shall be incorporated:

(a) Bioconcentration factors of the substances in the commonly consumed fish in the District;

(b) Percent lipids in the commonly consumed fish in the District; and

(c) Information regarding the consumption by the District citizens of fish caught from the District waters.

1106.9 The determination of 1106.8 (a) and (b) shall be done by **EPA**-approved methods.

1106.10 The **criteria**, based on a site-specific study and information collected through the study, shall be calculated using relations developed by **EPA** (Technical Support Document for Water Quality-Based Toxics Control (EPA/505/2-90-001) issued March, 1991), minus the component for drinking water, as follows:

(a) For noncarcinogens:

NEW **CRITERIA** = (RfD x WT)/(FC x L x FM x BCF)

where RfD is the reference dose from the EPA Integrated Risk Information System (IRIS) database, WT is seventy (70) kilograms, FC is the daily fish consumption by the exposed population in kilograms per day, L is the ratio of lipid fraction of fish tissue consumed to three percent (3%), FM is the food chain multiplier and BCF is the bioconcentration factor for fish with three percent (3%) lipid.

(b) For carcinogens:

NEW **CRITERIA** = (RL x WT)/(ql* x FC x L x FM x BCF)

where WT, FC, L, FM, and BCF are as stated above; RL is 10^{-6} and ql* is the carcinogenic potency factor from the EPA IRIS database.

1106.11 If the effluent limitation for a metal in a discharge permit is specified as "total recoverable", and the criterion for it in subsection 1104.7 is specified as "dissolved", either of the following two (2) approaches based on The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit From a

Dissolved Criterion (EPA 823-b-96-007) June 1996 may be used, subject to review and approval by the Director:

(a) The criterion may be used as total recoverable for the purpose of establishing effluent limitations; or

(b) A site-specific ratio between the dissolved and total recoverable metal may be developed by systematic monitoring and analysis of the effluent and of the receiving water at the edge of the **mixing zone** during periods that reflect the environmental conditions on which the permit was issued. This ratio shall incorporate considerations to avoid toxicity to aquatic organisms from deposition to the sediment outside of the **mixing zone**. The ratio of dissolved to total recoverable metal will then be used to determine the total recoverable effluent limits based on the dissolved metal criterion.

1106.12 The Director may establish additional requirements for adopting site-specific water quality **standards**.

SOURCE: Final Rulemaking published at 40 DCR 4203, 4210 (July 2, 1993); and renumbered by Final Rulemaking published at 41 DCR 1075 (March 4, 1994); as amended by Final Rulemaking published at 47 DCR 284 (January 21, 2000); and by Final Rulemaking published at 49 DCR 3012 (April 5, 2002).

1107 to 1149 SECTIONS RESERVED

SOURCE: Final Rulemaking published at 40 DCR 4203, 4210 (July 2, 1993); and renumbered by Final Rulemaking published at 41 DCR 1075 (March 4, 1994); as amended by Final Rulemaking published at 47 DCR 284 (January 21, 2000); and by Final Rulemaking published at 49 DCR 3012 (April 5, 2002).

1150 to 1157 [OMITTED GROUND WATER – The Ground Water regulations are available in the official DCMR and D.C. Register]

1158 [OMITTED ENFORCEMENT – The enforcement provisions pertaining to surface water are contained in the Ground Water regulations, available in the official DCMR and D.C. Register]

1199 DEFINITIONS

1199.1 When used in this chapter, the following terms shall have the meanings ascribed:

Acute toxic - the concentration of a substance which is lethal to fifty percent (50%) of the test organisms within ninety-six (96) hours, also referred to as the LC_{50}.

Ambient - those conditions existing before or upstream of a source or incidence of pollution.

Background water quality - the levels of chemical, physical, biological, and radiological constituents or parameters in the ground water upgradient of a

facility, practice, or activity and which have not been affected by that facility, practice, or activity.

Best management practices - one or several practices found to be the most effective and practical means of preventing or reducing point and non-point source pollution to levels that are compatible with water quality goals.

Contamination - an impairment of water quality by biological, chemical, physical, or radiological materials which lowers the water quality to a degree that creates a potential hazard to the environment or public health or interferes with a designated use.

Criteria - any of the group of physical, chemical, biological, and radiological water quality parameters and the associated numerical concentrations or levels that compose the numerical standards of the water quality standards and that define a component of the quality of the water needed for a designated use

CCC or Criteria Continuous Concentration - the highest concentration of a pollutant to which aquatic life can be exposed for an extended period of time (four-day (4-day) average) without deleterious effects at a frequency that does not exceed more than once every three (3) years.

CMC or Criteria Maximum Concentration - the highest concentration of a pollutant to which aquatic life can be exposed for a short period of time (one-hour (1-hour) average) without deleterious effects at a frequency that does not exceed more than once every three (3) years.

Current use - the use that is generally and usually met in the waterbody in spite of periodic failure to meet numeric criteria for that use.

Department - the Department of Health.

Designated use - the use specified for the waterbody in the water quality standards.

Director - the Director of the Department, or his or her designee.

EPA - U. S. Environmental Protection Agency.

Early warning value - a concentration that is a percentage of or practical quantitation limit for a ground water quality criterion or enforcement standard.

Enforcement standard - the value assigned to a contaminant for the purpose of regulating an activity, which may be the same as the criterion for that contaminant.

Existing use - the use actually attained in the waterbody on or after November 28, 1975.

Federal Clean Water Act - the Federal Water Pollution Control Act, approved October 18, 1972 (86 Stat. 816; 33 U.S.C. § 1251 *et seq.*), as amended.

Ground water - underground water, but excluding water in pipes, tanks, and other containers created or set up by people.

Harmonic mean flow - the number of daily flow measurements divided by the sum of the reciprocals of the flows. That is, it is the reciprocal of the mean of the reciprocals.

High quality waters - waters of a quality which is better than needed to protect fishable and swimmable streams.

LC_{50} or lethal concentration - the numerical limit or concentration of a test material mixed in water, that is lethal to fifty percent (50%) of the aquatic organisms exposed to the test material for a period of ninety-six (96) hours.

Landfill - a disposal facility or part of a facility at which solid waste is permanently placed in or on land and which is not a landspreading facility.

Landspreading disposal facility - a facility that applies sludge or other solid wastes onto the land or incorporates solid waste in the soil surface at greater than vegetative utilization and soil conditioners/immobilization rates.

Load or Loading - the total quantity of a pollutant in a given period of time, e.g., pounds of a pollutant per day.

Mixing zone - a limited area or a volume of water where initial dilution of a discharge takes place and where numerical water quality criteria may be exceeded but acute toxic conditions are prevented from occurring.

Narrative criteria - a condition that should not be attained in a specific medium to maintain a given designated use and is generally expressed in a "free from" format.

Nonpoint source - any source from which pollutants are or may be discharged other than a point source.

Numerical criteria - the maximum level of a contaminant, or the minimum level of a constituent, or the acceptable range of a parameter in water to maintain a given designated use.

Permit or Permitted - an activity, facility or entity authorized through a department permit to treat, store, or dispose of materials or wastes.

Point of compliance - the point or points where the water quality enforcement standard or criterion must not be exceeded.

Point source - any discrete source of quantifiable pollutants, including, a municipal treatment facility discharge, residential, commercial or industrial waste discharge or a combined sewer overflow; or any discernible, confined and discrete conveyance, including any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, or concentrated animal feeding operation from which contaminants are or may be discharged.

Pollution - the man-made or man-induced alteration of the chemical, physical, biological, or radiological integrity of water.

Pollutant - any substance which may alter or interfere with the restoration or maintenance of the chemical, physical, radiological, or biological integrity of the

waters of the District including dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions chemical wastes, hazardous wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, oil, gasoline and related petroleum products, and industrial, municipal, and agricultural wastes.

Practical quantitation limit - the lowest concentration of a substance that generally can be determined by qualified laboratories within specified limits of precision and accuracy under routine laboratory operating conditions in the matrix of concern.

Primary contact recreation - those water contact sports or activities that result in frequent whole body immersion and/or involve significant risks of ingestion of the water.

Responsible party - any person who has caused or is causing pollution or has created or is creating a condition from which pollution is likely to occur.

Secondary contact recreation - those water contact sports or activities that seldom result in whole body immersion and/or do not involve significant risks of ingestion of the water.

Solid waste - all putrescible and non-putrescible solid and semisolid wastes, including garbage, rubbish, ashes, industrial wastes, swill, demolition and construction wastes, abandoned vehicles or parts thereof, and discarded commodities. This includes also includes all liquid, solid and semisolid materials which are not the primary products of public, private, industrial or commercial mining, and agricultural operations.

Standards - those regulations, in the form of numerical, narrative, or enforcement standards, that specify a level of quality of the waters of the District necessary to sustain the designated uses.

Surface impoundment - a facility or part of a facility which is a natural topographic depression, man-made excavation, or diked area formed primarily of earthen materials (although it may be lined with man-made materials), and that is designed to hold an accumulation of liquids or sludge.

Surface waters - all rivers, lakes, ponds, wetlands, inland waters, streams, and all other water and water courses within the jurisdiction of the District of Columbia.

Toxic substance - Any substance or combination of substances that after discharge and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, may cause death, disease, behavioral abnormalities, cancer,, genetic mutations, physiological malfunctions (including malfunctions in reproduction), or physical deformities, in the organism or its offspring.

Trend analysis - a statistical methodology used to detect net changes or trends in contaminant levels over time.

Water Effect Ratio or WER - the ratio of site water LC_{50} value to the laboratory water LC_{50} value.

Waters of the District - flowing and still bodies of water, whether artificial or natural, whether underground or on land, so long as in the District of Columbia, but excludes water on private property prevented from reaching underground or land water courses, and water in closed collection or distribution systems.

Wetland - a marsh, swamp, bog or other area periodically inundated by tides or having saturated soil conditions for prolonged periods of time and capable of supporting aquatic vegetation.

1199.2 When used in this chapter, the following abbreviations shall have the meaning ascribed:

°C	-	degrees centigrade
M	-	Meter
Mg/L	-	milligrams per liter
ML	-	Milliliter
NPDES	-	National Pollutant Discharge Elimination System
NTU	-	nephelometric turbidity units
µg/L	-	microgram per liter
WQS	-	water quality standard

SOURCE: Final Rulemaking published at 40 DCR 4203, 4210 (July 2, 1993); and renumbered by Final Rulemaking published at 41 DCR 1075 (March 4, 1994); as amended by Final Rulemaking published at 47 DCR 284 (January 21, 2000); by Final Rulemaking published at 49 DCR 3012 (April 5, 2002); and by Final Rulemaking published at 49 DCR 4854 (May 24, 2002).

Arlington County Water Pollution Control Plant
VA0025143
Application Monitoring
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Appendix A
Pollutants required to be monitored a minimum of 3 times per permit period no more than 4.5 years apart

All results in ug/L unless otherwise noted

Attachment 9

Pollutant	Sample Date											
	8/4/2004	8/4/2004	8/4/2004	8/4/2004	9/21/2005	9/21/2005	8/2/2006	6/21/2007	6/21/2007	6/22/2007	12/12/2007	12/13/2007
Metals	Composite Sample				comp	9:45	8:15	comp	11:15	8:00	comp	comp
Aluminum, total							45					
Antimony, Total	<5	<5			<5		<5	<4	<4			
Arsenic, total	<2	<2			<2		<2	<2	<2			
Beryllium, total	<0.5	<0.5			<0.5		<0.5	<0.1	<0.1			
Cadmium, Total	3.9	0.8			<0.5		<0.5	<0.2	<0.2			
Chromium, Total	<2	<2			<2		13	<0.7				
Copper, Total	12	8.7			2.5		4.4	17	14			
Lead, Total	<2	<2			<2		<2	<0.9	<3			
Mercury, Total	<0.5	<0.5			<0.5		<0.5	<0.5	<0.5			
Molybdenum, Total					8							
Nickel, Total	2.6	2.4			<2		3.3	3	<2			
Selenium, Total	<5	<5			*		<2					
Silver, Total	<1	<1			<1		<1	<0.6	<0.6			
Thallium, Total	<2	<2			<2		<2	<2	<2			
Zinc, Total	33	41			33		40	50	40			
	dissolved metals											
VOA - Grab		8/4/2004	8/4/2004	8/4/2004	9/21/2005	9/21/2005	8/2/2006	6/21/2007	6/21/2007	6/22/2007	12/12/2007	12/13/2007
TIME		8:30	10:30	12:00	comp	9:45	8:15	comp	11:15	8:00	comp	comp
Acrolein		<5	<5	<5		<5	<10		<1	<4		
Acrylonitrile		<5	<5	<5		<5	<5		<1	<1		
Benzene		<5	<5	<5		<5	<5		<1	<1		
Bromoform		<5	<5	<5		<5	<5		<1	<1		
Carbon Tetrachloride		<5	<5	<5		<5	<5		<1	<1		
Chlorobenzene		<5	<5	<5		<5	<5		<1	<1		
Chlorodibromomethane		<5	<5	<5		7.1	<5		<1	<1		
Chloroethane		<5	<5	<5		<5	<5		<1	<1		
2- Chloroethylvinyl ether		<5	<5	<5		<5	<5		<1	<1		
Chloroform		9.8	<5	<5		9.4	5.8		1.5	3.5		
Dichlorobromomethane		<5	<5	<5		8.1	5.5		<1	1.7		
1,1- Dichloroethane		<5	<5	<5		<5	<5		<1	<1		
1,2- Dichloroethane		<5	<5	<5		<5	<5		<1	<1		
1,1- Dichloroethene		<5	<5	<5		<5	<5		<1	<1		

OUTFALL 001

All results in ug/L unless otherwise noted

Pollutant	Sample Date											
	8/4/2004	8/4/2004	8/4/2004	8/4/2004	9/21/2005	9/21/2005	8/2/2006	6/21/2007	6/21/2007	6/22/2007	12/12/2007	12/13/2007
trans Dichloroethylene												
1,2- (trans-1,2 dichloroethene)		<5	<5	<5		<5	<5		<1	<1		
Dichloromethane (Methylene Chloride)		<5	<5	<5		<5	<5		<1	<1		
1,2- Dichloropropane		<5	<5	<5		<5	<5		<1	<1		
1,3- Dichloropropylene		<5	<5	<5		<5	<5		<1	<1		
Ethylbenzene		<5	<5	<5		<5	<5		<1	<1		
Methyl bromide (bromomethane)		<5	<5	<5		<5	<5		<1	<1		
Methyl chloride(chloromethane)		<5	<5	<5		<5	<5		<1	<1		
Monochlorobenzene (Chlorobenzene)		<5	<5	<5		<5	<5		<1	<1		
1,1,2,2- Tetrachloroethane		<5	<5	<5		<5	<5		<1	<1		
Tetrachloroethylene		130	<5	<5		<5	<5		<1	<1		
Toluene		<5	<5	<5		<5	<5		<1	<1		
1,1,1- Trichloroethane		<5	<5	<5		<5	<5		<1	<1		
1,1,2- Trichloroethane		<5	<5	<5		<5	<5		<1	<1		
Trichloroethylene		8	<5	<5		<5	<5		<1	<1		
Vinyl Chloride		<5	<5	<5		<5	<5		<1	<1		
Xylene, total		<2	<2	<2			<5		<1	<1		
BNA - Composite or Grab		**8/4/2004**	**8/4/2004**	**8/4/2004**	**9/21/2005**	**9/21/2005**	**8/2/2006**	**6/21/2007**	**6/21/2007**	**6/22/2007**	**12/12/2007**	**12/13/2007**
Acenaphthene						<5.5	<5	<78	<1.8		<2.8	<2.8
Acenaphthylene						<5.5	<5	<78	<1.8		<2.8	<2.8
Anthracene						<5.5	<5	<78	<1.8		<1.4	<1.4
Benzidine						<5.5	<5	<830	<19		<14	<14
Benzo(a)anthracene						<5.5	<5	<78	<1.8		<1.4	<1.4
Benzo(a)pyrene						<5.5	<5	<78	<1.8		<1.4	<1.4
Benzo(b)fluorathene (3,4-benzofluornthene)						<5.5	<5	<78	<1.8		<1.4	<1.4
Benzo(ghi)perylene						<5.5	<5	<78	<1.8		<1.4	<1.4
Benzo(k)fluorathene						<5.5	<5	<78	<1.8		<1.4	<1.4

Arlington County Water Pollution Control Plant
VA0025143
Application Monitoring
OUTFALL 001

Appendix A
Pollutants required to be monitored a minimum of 3 times per permit period no more than 4.5 years apart

All results in ug/L unless otherwise noted

Pollutant	Sample Date											
	8/4/2004	8/4/2004	8/4/2004	8/4/2004	9/21/2005	9/21/2005	8/2/2006	6/21/2007	6/21/2007	6/22/2007	12/12/2007	12/13/2007
bis(2-chloroethoxy)methane						<5.5	<5	<156	<3.6		<1.4	<1.4
bis(2-chloroethyl)ether						<5.5	<5	<156	<3.6		<1.4	<1.4
bis(2-chloroisopropyl) ether						<5.5	<5	<156	<3.6		<1.4	<1.4
Bromophenyl phenyl 4- ether						<5.5	<5	<156	<3.6		<2.8	<2.8
Butybenzylphthalate						<5.5	<5	1980	<3.6		<2.8	<2.8
2- Chloronaphthalene						<5.5	<5	<156	<3.6		<2.8	<2.8
2- Chlorophenol						<5.5	<5	<416	<9.5		<7.5	<7.5
Chlorophenyl phenyl 4- ether						<5.5	<5	<156	<3.6		<2.8	<2.8
Chrysene						<5.5	<5	<78	<1.8		<1.4	<1.4
Di n-octyl phthalate						<5.5	<5	298	<9.5		<7.5	<7.5
Di-2-Ethylhexyl Phthalate (bis(2-ethylhexyl) phthalate						<5.5	<5	669	<3.6		15	16
Dibenzo(a,h) anthracene						<5.5	<5	<78	<1.8		<1.4	<1.4
Dibutylphthalate (di-N-butyl phthalate)						<5.5	<5	660	<3.6		<2.8	<2.8
1,2- Dichlorobenzene						<5.5	<5		<1	<1		
1,4- Dichlorobenzene						<5.5	<5		<1	<1		
1,3- Dichlorobenzene						<5.5	<5		<1	<1		
3,3'- Dichlorobenzidine						<5.5	<5	<200	<9.5		<7.5	<7.5
2,4- Dichlorophenol						<5.5	<5	<416	<9.5		<7.5	<7.5
Diethylphthalate						<5.5	<5	<416	<9.5		<7.5	<7.5
Dimethyl phthalate						<5.5	<5	<416	<9.5		<7.5	<7.5
2,4- Dimethylphenol						<5.5	<5	<416	<9.5		<7.5	<7.5
Dinitro-o-cresol (4,6-4,6- dinitro-2-methyl phenol)						<5.5	<5	<830	<19		<7.5	<7.5
2,4- Dinitrophenol						<5.5	<5	<830	<19		<7.5	<7.5
2,6- Dinitrotoluene						<5.5	<5	<416	<9.5		<7.5	<7.5
2,4- Dinitrotoluene						<5.5	<5	<156	<3.6		<2.8	<2.8
Di-N-octyl phthalate						<5.5	<5	298	<9.5		<7.5	<7.5
1,2- Diphenylhydrazine						<5.5	<5	<156	<3.6		<2.8	<2.8
Fluoranthene						<5.5	<5	<80	<1.8		<1.4	<1.4

Arlington County Water Pollution Control Plant **Appendix A**
VA0025143 Pollutants required to be monitored a minimum of 3 times per permit period no more than 4.5 years apart
Application Monitoring
OUTFALL 001 All results in ug/L unless otherwise noted

Pollutant	Sample Date											
	8/4/2004	8/4/2004	8/4/2004	8/4/2004	9/21/2005	9/21/2005	8/2/2006	6/21/2007	6/21/2007	6/22/2007	12/12/2007	12/13/2007
Fluorene						<5.5	<5	<80	<1.8		<1.9	<1.9
Hexachlorobutadiene						<5.5	<5	<156	<3.6		<2.8	<2.8
Hexachlorocyclopentadiene						<5.5	<5	<416	<9.5		<7.5	<7.5
Hexachloroethane						<5.5	<5	<156	<3.6		<2.8	<2.8
Hexechlorobenzene						<5.5	<5	<156	<3.6		<2.8	<2.8
Indeno(1,2,3-cd) pyrene						<5.5	<5	<100	<2.4		<1.4	<1.4
Isophorone						<5.5	<5	<104	<3.6		<2.8	<2.8
N Nitrosodimethylamine						<5.5	<5	<156	<3.6		<2.8	<2.8
Napthalene						<5.5	<5	<80	<1.8		<2.8	<2.8
Nitrobenzene						<5.5	<5	<156	<3.6		<2.8	<2.8
2- Nitrophenol						<5.5	<5	<400	<9.5		<7.5	<7.5
4- Nitrophenol						<5.5	<5	<400	<9.5		<7.5	<7.5
N-Nitrosodi-n-propylamine						<5.5	<5	<156	<3.6		<3.8	<3.8
N-Nitrosodiphenylamine						<5.5	<5	<150	<3.6		<7.5	<7.5
p-chloro-m-cresol (4-chloro 3-methylphenol)						<5.5	<5	<400	<9.5		<7.5	<7.5
Pentachlorophenol						<5.5	<5	<831	<19		<7.5	<7.5
Phenanthrene						<5.5	<5	<80	<1.8		<1.4	<1.4
Phenol						<5.5	<5	600	<9.5		<7.5	<7.5
Pyrene						<5.5	<5	<80	<1.8		<1.4	<1.4
1,2,4- Trichlorobenzene						<5.5	<5	<200	<3.6		<2.8	<2.8
2,4,6- Trichlorophenol						<5.5	<5	<400	<9.5		<7.5	<7.5
Pesticides/PCB - Composite or Grab		**8/4/2004**	**8/4/2004**	**8/4/2004**	**9/21/2005**	**9/21/2005**	**8/2/2006**	**6/21/2007**	**6/21/2007**			
Aldrin		<0.05					<0.05					
Chlordane		<0.5					<0.05					
Chlorpyrifos		<5					<0.05					
DDD		<0.05					<0.05					
DDE		<0.05					<0.05					
DDT		<0.05					<0.05					
Demeton		<5					<0.05					
Dieldrin		<0.05					<0.05					
Endosulfan		*					<0.05					

Arlington County Water Pollution Control Plant **Appendix A**
VA0025143 Pollutants required to be monitored a minimum of 3 times per permit period no more than 4.5 years apart
Application Monitoring
OUTFALL 001 All results in ug/L unless otherwise noted

Pollutant	Sample Date											
	8/4/2004	8/4/2004	8/4/2004	8/4/2004	9/21/2005	9/21/2005	8/2/2006	6/21/2007	6/21/2007	6/22/2007	12/12/2007	12/13/2007
Endrin		<0.05					<0.05					
Guthion		<0.05					<0.05					
Heptachlor		<0.05					<0.05					
Lindane (g-BHC)		<0.05					<0.05					
Malathion		<5					<0.05					
Methoxychlor							<0.05					
Mirex		<0.5					<0.05					
Parathion		<5					<0.05					
Aroclor 1242		<0.5					<0.05					
Aroclor 1254		<0.5					<0.05					
Aroclor 1016		<0.5					<0.05					
Aroclor 1221		<0.5					<0.05					
Aroclor 1232		<0.5					<0.05					
Aroclor 1248		<0.5					<0.05					
Aroclor 1260		<0.5					<0.05					
Toxaphene		<0.5					<0.05					
alpha BHC		<0.05										
beta BHC		<0.05										
delta BHC		<0.05										
alpha endosulfan (Endosulfan I)		<0.05										
beta endosulfan (Endosulfan II)		<0.05										
endosulfan sulfate		<0.05										
endrin aldehyde		<0.05										
hepachlor epoxide		<0.05										
Dimethoate		<5										
Disulfoton		<5										
Methyl parathion		<5										
Azinophos methyl		<5										
Phorate		<5										
Misc		**8/4/2004**	**8/4/2004**	**8/4/2004**	**9/21/2005**	**9/21/2005**	**8/2/2006**	**6/21/2007**	**6/21/2007**	**6/22/2007**		
					comp	**9:45**	**8:15**	**comp**	**11:15**	8:00		
Cyanide, ug/L		**				**						

Arlington County Water Pollution Control Plant
VA0025143
Application Monitoring
OUTFALL 001

Appendix A

Pollutants required to be monitored a minimum of 3 times per permit period no more than 4.5 years apart

All results in ug/L unless otherwise noted

Pollutant	Sample Date											
	8/4/2004	**8/4/2004**	**8/4/2004**	**8/4/2004**	**9/21/2005**	**9/21/2005**	**8/2/2006**	**6/21/2007**	**6/21/2007**	**6/22/2007**	**12/12/2007**	**12/13/2007**
Hardness (as CaCO3), mg/L		150			180		220	164	172			
Oil & grease, mg/L		2		<2		3	<5		<2.4			
Phenol, Total (420.1 or 420.2)		<10				<10	<10		<3	<3		
Total Dissolved Solids, mg/L		440					440	454	497	516		
Chloride					98							
Sulfide		<0.1										

Appendix A

Arlington County Water Pollution Control Plant
VA0025143
Cyanide and Selenium Monitoring Summary
Outfall 001

DT for Cyanide and Selenium are 5 and 0.7 ug/L, respectively
QL for Cyanide and Selenium are 10 and 2 ug/L, respectively

Date	Cyanide (ug/L)	Cyanide, w/ ascorbic acid (ug/L)	Selenium, total (ug/L)	Selenium, dissolved (ug/L)	NO2/NO3 (mg/L)	Sulfide (mg/L)	TRC (mg/L)	Bisulfite Feed Rate (gph)	Flow
Count	27	27	27						
10/6/2003	<10	<10	<2	NA	NA	NA	NA	NA	NA
11/4/2003	<5	<5	<2	NA	NA	NA	NA	NA	NA
12/3/2003	<5	<5	<2	<0.7	8.2	<0.1	0.01	0.24	35
1/11/2004	<5	<5	<2	<0.7	NA	<0.1	0.02	0.17	35.1
2/9/2004	<5	<5	<2	<0.7	3.2	<0.1	0	0.17	42.9
3/11/2004	<5	<5	<2	<0.7	NA	<0.1	0.02	0.17	36
4/6/2004	<5	<5	<2	<0.7	NA	<0.1	NA	NA	32.2
5/3/2004	<5	<5	<2	<0.7	NA	<0.1	0.01	0.18	36.6
6/7/2004	<5	<5	<2	<0.7	6.88	<0.1	0	0.11	35.6
8/2/2004	<5	<5	<2	<0.7	0/6.0	<0.1	0.02	0.18	32.6
9/10/2004	<5	<5	<2	<0.7	NA	<0.1	0.01	0.1	24.6
11/1/2004	<5	<25	<2	<0.7	8.81	<0.1	0.01	0.1	37
1/3/2005	<5	<5	<2	<0.7	NA	<0.1	NA	0.15	28.4
3/1/2005	<5	<5	<2	<0.7	NA	<0.1	0.02	0.07	30.8
4/12/2005	<5	<5	<2	<0.7	NA	NA	NA	0.09	39
5/4/2005	7	<5	<2	<0.7	8.64	NA	0.02	0.11	33.4
7/14/2005	<5	<5	<2	<0.7	NA	<0.1	0.02	0.11	25.6
8/4/2005	<5	<5	<2	<0.7	NA	<0.1	0.02	0.02	38.1
11/8/2005	<5	<5	<2	<0.7	NA	NA	0.02	0.19	35.9
2/14/2006	<5	<5	<2	NA	NA	NA	NA	NA	NA
6/7/2006	<5	<5	<2						
8/2/2006	<5	<5	<2						
12/6/2006	<5	<5	1						
4/10/2007	<5	<5	<2						
6/5/2007	<5	<5	0.5						
8/1/2007	<5	<5	<2						
9/6/2007	<5	<5	<2						
9/13/2007	<5	<5	<2						

Sample received by lab at 7'C

HRSD
P.O. BOX 5911, VIRGINIA BEACH, VIRGINIA 23471-0911 · (757) 460-4205· FAX (757) 460-6586

July 17 2008

Dennis Wisler
Water Pollution Control Division
Arlington County
3402 South Glebe Road
Arlington, VA 22202

RE: COPPER

Dear Dennis:

Enclosed are the analytical results, analytical QA report, field sheets and chain of custody record for the July 8-10, 2008 sampling event.

The Field Blank for July 8th collected in association with the sampling event was received in a broken container and no analysis could be performed.

Should you have any questions, please feel free to contact me at (757) 460-4247.

Sincerely,

C.M. Reno
for

Danny Barker
Environmental Scientist

DLB/cmr

Enclosures

HRSD
P.O. BOX 5911, VIRGINIA BEACH, VIRGINIA 23471-0911 • (757) 460-4205 • FAX: (757) 460-6586
www.hrsd.com

ANALYTICAL REPORT

Project: Arlington
Customer Sample ID: Final Effluent
Project Code: ARL
Sample Parameter: Copper
Sample Date: 07/08/08

Analyte	Method	Unit	Result	Report Limit	Analyst	Analysis Date	Analysis Time
Total Metals							
FNE	EPA 200.8	ug/L	1.9	1.0	CBATO	07/16/08	12:24

Notes
Report Limit is lowest concentration at which quantitation is demonstrated.

Authorization: DRhue **Date:** 071608

HRSD
P.O. BOX 5911, VIRGINIA BEACH, VIRGINIA 23471-0911 • (757) 460-4205 • FAX: (757) 460-6586
www.hrsd.com

ANALYTICAL REPORT

Project: Arlington
Customer Sample ID: Final Effluent
Project Code: ARL
Sample Parameter: Copper
Sample Date: 07/09/08

Analyte	Method	Unit	Result	Report Limit	Analyst	Analysis Date	Analysis Time
Total Metals							
FB	EPA 200.8	ug/L	<1.0	1.0	CBATO	07/16/08	12:16
FNE	EPA 200.8	ug/L	1.9	1.0	CBATO	07/16/08	12:49

Notes
Report Limit is lowest concentration at which quantitation is demonstrated.

Authorization: PR Lee **Date:** 071608

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www.hrsd.com

ANALYTICAL REPORT

Project: Arlington
Customer Sample ID: Final Effluent
Project Code: ARL
Sample Parameter Copper
Sample Date: 07/10/08

Analyte	Method	Unit	Result	Report Limit	Analyst	Analysis Date	Analysis Time
Total Metals							
FB	EPA 200.8	ug/L	<1.0	1.0	CBATO	07/16/08	12:20
FNE	EPA 200.8	ug/L	1.9	1.0	CBATO	07/16/08	12:53

Notes
Report Limit is lowest concentration at which quantitation is demonstrated.

Authorization: _____ **Date:** 071608

QUALITY ASSURANCE REPORT
Level 1

Project:	**Arlington**
Customer Sample ID:	**Final Effluent**
Project Code:	**ARL**
Sample Point:	**FB (070908 - 071008); FNE (070808 - 071008)**

Analytical Run Information	**Cu**
Method	**200.8**
Units	**ug/L**
Method Detection Limit (MDL)	0.08
Report Limit (RL)	1.0
Average LRB	<0.08

Total Metals	
Sample ID: ARL FNE 070808	
Matrix Spike Conc.	20.0
MS Percent Recovery	96%
MSD Percent Recovery	103%
MS/MSD RPD	6

LRB - Laboratory Reagent Blank
MS - Matrix Spike
MSD - Matrix Spike Duplicate
RPD - Relative Percent Difference
Report Limit is lowest concentration at which quantitation is demonstrated. Values below Report Limit should not be used for compliance determinations due to high degree of uncertainty.

Validated By: _____ Date: 071608

Arlington Co. - Water Pollution Control Plant

Information checked before the start of each sampling event:

1. a. Average of the last five days FNE flow 24.070 mgd
   b. Expected FNE flow for next 24 hour sampling period 24 mgd
2. List the last five days FNE TSS data with the most recent last <1, 1, 1.8, <1, 1 mg/L
3. Is rain expected over the next 24 hours (Y) N (If yes, explain below.)
4. Does RWI have any abnormal characteristics (i.e.. odor, color) ? Y (N)
   If yes was recorded for the above question, describe characteristics in the notes section below
5. Composite start time / date:
   Metals FB/FNE: 7/9/08 @ 1430 Calibrated to: 1500 ml
7. Sample Personnel: R. Wentworth, _____

Information checked at the end of the 24 hour sampling period

1. Are sample volumes equal in all composite containers ? (Y) N
2. Number of samples collected in each composite container 48
3. FNE flow for the sampling period 25.723, 23.741
4. TSS during sampling period 1.4, 1.6
6. Are all lids, valves and caps secure ? (Y) N
7. Composite end time / date:
   Metals FB/FNE: 7/10/08 @ 1430
9. Sampling Personnel: R. Wentworth, _____

Record any other circumstances which could affect the sample result:

Brief rain during the night of 7/9/08.

Arlington Co. - Water Pollution Control Plant

Information checked before the start of each sampling event:

1. a. Average of the last five days FNE flow 24.152 mgd
   b. Expected FNE flow for next 24 hour sampling period 24 mgd
2. List the last five days FNE TSS data with the most recent last 1.2, <1, 1, 1.8, <1
3. Is rain expected over the next 24 hours ? (Y) / N (If yes, explain below.)
4. Does RWI have any abnormal characteristics (i.e.. odor, color) ? Y / (N)
   If yes was recorded for the above question, describe characteristics in the notes section below
5. Composite start time / date:
   Metals FB/FNE: 7/8/08 @1430 Calibrated to: 150ml
7. Sample Personnel: B. Weckworth, _____

Information checked at the end of the 24 hour sampling period

1. Are sample volumes equal in all composite containers ? (Y) / N
2. Number of samples collected in each composite container 48
3. FNE flow for the sampling period 24.216, 25.723
4. TSS during sampling period <1, 1
6. Are all lids, valves and caps secure ? (Y) / N
7. Composite end time / date:
   Metals FB/FNE: 7/9/08 @1400
9. Sampling Personnel: B. Weckworth, _____

Record any other circumstances which could affect the sample result:

Thunderstorms through out the day 7/8 - 7/9. Outside of FNE tubbing unclean

Arlington Co. - Water Pollution Control Plant

Information checked before the start of each sampling event:

1. a. Average of the last five days FNE flow 24.052 mgd
   b. Expected FNE flow for next 24 hour sampling period 24mgd
2. List the last five days FNE TSS data with the most recent last 1.2, 1.2
   <1, 1, 1.8 mg/L
3. Is rain expected over the next 24 hours ? Y (N) (If yes, explain below.)
4. Does RWI have any abnormal characteristics (i.e.. odor, color) ? Y (N)
   If yes was recorded for the above question, describe characteristics in the notes section below
5. Composite start time / date:
   Metals FB/FNE: 7/7/08 @ 1430 Calibrated to: 150 ml
7. Sample Personnel: B. Weckworth, _____

Information checked at the end of the 24 hour sampling period

1. Are sample volumes equal in all composite containers ? (Y) / N
2. Number of samples collected in each composite container 48
3. FNE flow for the sampling period 25.006 mgd, 24.216 mgd
4. TSS during sampling period <1, 1
6. Are all lids, valves and caps secure ? (Y) / N
7. Composite end time / date:
   Metals FB/FNE: 7/8/08 @ 1400
9. Sampling Personnel: B. Weckworth, _____

Record any other circumstances which could affect the sample result:

Field blank bottle had a crack, which caused sample to leak out of the bottle

HAMPTON ROADS SANITATION DISTRICT

CENTRAL ENVIRONMENTAL LABORATORY
1432 AIR RAIL AVENUE
VIRGINIA BEACH, VA 23455
TEL: 757-460-4214
FAX: 757-460-6586

CHAIN OF CUSTODY

PROJECT NAME/CODE: Arlington County Water Pollution Control Plant

CUSTOMER SAMPLE ID	HRSD Use Only: PROJECT CODE	HRSD Use Only: SAMPLE POINT	DATE	TIME	SAMPLED BY	Circle One: MATRIX	Circle One: SAMPLE TYPE	ANALYSES REQUESTED, CGN & NUMBER OF CONTAINERS: Total Metals (5)							HRSD Use Only: Presv'd Checked	HRSD Use Only: CONT. COUNT
	ARL	FB	7/8/2008	1400	BW	L	C	1 *							✓	1
	ARL	FNE	7/8/2008	1400	BW	L	C	1							✓	1
	ARL	FB	7/9/2008	1400	BW	L	C	1							✓	1
	ARL	FNE	7/9/2008	1400	BW	L	C	1							✓	1
	ARL	FB	7/10/2008	1400	BW	L	C	1							✓	1
	ARL	FNE	7/10/2008	1400	BW	L	C	1							✓	1

COMMENTS: * Broken sample container submitted. Sample has leaked out of the container. Up to the discretion of the project manager / Lab manager to analize. BW 7/11/08

		Temp. Requirement	*Preservatives
Relinquished by / Signature	Date/Time 7/11/08 0845	Where required, submitted samples were transported in coolers maintained at ≤ 6 °C.	*Hg, Metals (pH<2 - HNO3) (Clean metals check in section)
Received by / Signature	Date/Time 7/11/08 0845		*O&G (pH<2 - HCl, check in section) & store ≤ 6 °C
Relinquished by / Signature	Date/Time	Yes ✓ No ___	CN (pH>12 - NaOH) & store ≤ 6 °C
Received by / Signature	Date/Time		*Sulfide (pH>9 - NaOH+ZnAc) & store ≤ 6 °C
Relinquished by / Signature	Date/Time	Int BW	*Micro ($Na_2S_2O_3$ + EDTA) & store < 10 °C
Received by / Signature	Date/Time		*COD, NUT, Phenols (pH<2 - H_2SO_4) & store ≤ 6 °C
Relinquished by / Signature	Date/Time		*TOC (pH<2 - H_3PO_4) & store ≤ 6 °C
Received by / Signature	Date/Time		*BOD, TSS, TVSS, Turbidity, Surfactant, Sulfate store ≤ 6 °C
			*NUT Non Acidified, Conductivity, Organics store ≤ 6 °C
All sample(s) met proper *preservation requirements.	Yes ✓ No ___ Int BW		*Cr (VI) (pH 9.3 - 9.7 - $(NH_4)_2SO_4$) & store ≤ 6 °C

Sample Type: B=Batch, C=Composite, G=Grab Matrix: L= Liquid , S = Solid CGN: Container Group Number

NOTE: ALL APPLICABLE INFORMATION MUST BE COMPLETED PRIOR TO ACCEPTANCE.

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34 Dogwood Lane - Middletown, PA 17057 Phone: 717-944-5541 Fax: 717-944-1430

Certificate of Analysis

Project Name:	CONTRACT 293-07	Workorder:	9744099
Purchase Order:	138514	Workorder ID:	Plant

Mr. Dennis Wisler
Arlington County, VA
3402 South Glebe Road
Arlington, VA 22202

July 14, 2008

Dear Mr. Wisler,

Enclosed are the analytical results for samples received by the laboratory on Thursday, July 03, 2008

ALSI is a National Environmental Laboratory Accreditation Conference (NELAC) accredited laboratory and as such, certifies that all applicable test results meet the requirements of NELAC.

If you have any questions regarding this certificate of analysis, please contact Tonya Hironimus (Project Coordinator) or Anna G Milliken (Laboratory Manager) at (717) 944-5541.

Please visit us at www.analyticallab.com for a listing of ALSI's NELAC accreditations and Scope of Work, as well as other links to Water Quality documentation on the internet.

This laboratory report may not be reproduced, except in full, without the written approval of ALSI.

NOTE: ALSI has changed the report generation tool and while we have tried to retain the existing format, you will notice some changes in the laboratory report. Please feel free to contact ALSI in case you have any questions.

Analytical Laboratory Services, Inc.

This page is included as part of the Analytical Report and must be retained as a permanent record thereof.

Anna G Milliken
Laboratory Manager

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SAMPLE SUMMARY

Workorder: 9744099 Plant

Discard Date: 07/25/2008

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
9744099001	AWT1	Waste Water	6/25/08 07:00	7/3/08 18:45	Customer
9744099002	B1	Waste Water	6/25/08 07:00	7/3/08 18:45	Customer

Workorder Comments:

Notes

- Samples collected by ALSI personnel are done so in accordance with the procedures set forth in the ALSI Field Sampling Plan (20 - Field Services Sampling Plan).
- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
- The Chain of Custody document is included as part of this report.

Standard Acronyms/Flags

J, B	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference

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ANALYTICAL RESULTS

Workorder: 9744099 Plant

Lab ID: **9744099001** Date Collected: 6/25/2008 07:00 Matrix: Waste Water

Sample ID: **AWT1** Date Received: 7/3/2008 18:45

Parameters	Results	Units	Footnotes	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
METALS											
Copper, Total	0.0028	mg/L		0.0025	0.0004	EPA 200.8	7/8/08	BMS	7/10/08 17:16	AJB	A2

Sample Comments:

Anna G Milliken
Laboratory Manager

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ANALYTICAL RESULTS

Workorder: 9744099 Plant

Lab ID: **9744099002** Date Collected: 6/25/2008 07:00 Matrix: Waste Water

Sample ID: **B1** Date Received: 7/3/2008 18:45

Parameters	Results	Units	Footnotes	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
METALS											
Copper, Total	ND	mg/L		0.0025	0.0004	EPA 200.8	7/8/08	BMS	7/10/08 17:21	AJB	A2

Sample Comments:

Anna G Milliken
Laboratory Manager

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QUALITY CONTROL DATA

Workorder: 9744099 Plant

QC Batch: MDIG/19184 Analysis Method: EPA 200.8

QC Batch Method: EPA TRMD

Associated Lab Samples: 9744099001 9744099002

METHOD BLANK: 485849

Parameter	Result	Qualifiers	Units	Reporting Limit
Copper, Total	ND		mg/L	0.0025

LABORATORY CONTROL SAMPLE: 485850

Parameter	LCS Result	Qualifiers	Units	Spike Conc.	LCS % Rec	% Rec Limits
Copper, Total	0.0503		mg/L	0.05	101	85-115

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 485851 485852 Original: 9744099002

*****NOTE - The Original Result shown below is a raw result and is only used for the purpose of calculating Matrix Spike percent recoveries. This result is not a final value and cannot be used as such.*

Parameter	Original Result	Qualifiers	Units	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD
Copper, Total	-0.0001		mg/L	0.05	0.0527	0.0518	106	104	70-130	1.9	20

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 9744099 Plant

Lab ID	Sample ID	Prep Batch Method	Prep Batch	Analytical Method	Analytical Batch
9744099001	**AWT1**	EPA TRMD	MDIG/19184	EPA 200.8	META/21486
9744099002	**B1**	EPA TRMD	MDIG/19184	EPA 200.8	META/21486

Profile 46315

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CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK

* 9 7 4 4 0 9 9 *

of

Client Name: Arlington Co WPCB
Address: 3402 S. Glebe Rd
Contact: Walter
Phone#:
Project Name/#: Plant
Bill To: PO 138514

TAT: [ ] Normal-Standard TAT is 10-12 business days. [X] Rush-Subject to ALSI approval and surcharges.
Date Required: 7/15/08 Approved By:
Email? [X] -Y
Fax? [ ] -Y No.:

Container Type: P | Container Size: 250 | Preservative: HNO3

ANALYSES/METHOD REQUESTED: Cu; Report level 1 mg/L

Sample Description/Location (as it will appear on the lab report)	Sample Date	Military Time	*G or C	**Matrix	Cu	Enter Number of Containers Per Analysis Requested or Field Results Below.
1 AWT 1	4/25/08	7-7	C	W	✓	
2 B 1	"	4	C	W	✓	
3						
4						
5						
6						
7						
8						
9						
10						

Receipt Information (completed by Receiving Lab)
Cooler Temp: 1 Therm. ID: SN023579
No. of Coolers:

	Y	N	Initial
Custody Seals Present?		X	NC
(if present) Seals Intact?			
Received on Ice?	✓		
COC/Labels Complete/Accurate?	✓		
Cont. in Good Cond.?	✓		
Correct Containers?	✓		
Correct Sample Volumes?	✓		
Correct Preservation?	✓		
Headspace/Volatiles?			

Courier/Tracking #:

Sample/COC Comments:
Special Requirement. Report my level 1 mg/L
Need results by 7/15

RUSH

SAMPLED BY (Please Print):

LOGGED BY(signature): 7-7-08 0232
REVIEWED BY(signature): 07/07/08 1150

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 Benny Rajpal	7-3-08	10:31	2 ALS	7-3-08	1031
3	7-3-08	1641	4 SAB	7-3-08	1700
5 SAB	7-3-08	1605	6 ALS	7-3	1945
7			8		
9			10		

Data Deliverables: [ ] Standard [ ] CLP-like [ ] NJ-Reduced [ ] NJ-Full [ ] EDDs Required? If yes, format type:

State Samples Collected In: NC [ ] NJ [ ] NY [ ] PA [ ] Other: PWSID
SDWA Forms Required? yes [ ] yes [ ] yes [ ] yes [ ]
ALSI Field Services: [X] Pickup [ ] Labor [ ] Composite Sampling [ ] Rental Equipment [ ] Other:

DOD Criteria Required?

* G=Grab; C=Composite
**Matrix: Al=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater
***Container Type: AG-Amber Glass; CG-Clear Glass, PL-Plastic. Container Size: 250ml, 500ml, 1L, 8oz, etc. Preservative: HCl, HNO3, NaOH, etc.

Copies: WHITE-ORIGINAL CANARY-CUSTOMER COPY

Rev 5/08

4/21/2008 4:29:27 PM

Facility = Arlington WPCP
Chemical = Cadmium
Chronic averaging period = 4
WLAa = 7.5
WLAc = 1.8
Q.L. = .2
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = .8
Variance = .2304
C.V. = 0.6
97th percentile daily values = 1.94673
97th percentile 4 day average = 1.33103
97th percentile 30 day average= .964842
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

0.8

7/21/2008 10:38:06 AM

Facility = Arlington Co. WPCP
Chemical = Copper
Chronic averaging period = 4
WLAa = 23
WLAc = 15
Q.L. = 1.0
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 9
Expected Value = 6.12222
Variance = 13.4933
C.V. = 0.6
97th percentile daily values = 14.8979
97th percentile 4 day average = 10.1860
97th percentile 30 day average= 7.38372
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

1.9
1.9
1.9
8.7
2.5
4.4
17
14
2.8

4/21/2008 4:51:22 PM

Facility = Arlington WPCP
Chemical = Nickel
Chronic averaging period = 4
WLAa = 300
WLAc = 33
Q.L. = 2
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 3
Expected Value = 2.9
Variance = 3.0276
C.V. = 0.6
97th percentile daily values = 7.05691
97th percentile 4 day average = 4.82499
97th percentile 30 day average= 3.49755
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

2.4
3.3
3

4/21/2008 4:53:15 PM

Facility = Arlington WPCP
Chemical = Zinc
Chronic averaging period = 4
WLAa = 190
WLAc = 190
Q.L. = 10
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 5
Expected Value = 40.8
Variance = 599.270
C.V. = 0.6
97th percentile daily values = 99.2834
97th percentile 4 day average = 67.8826
97th percentile 30 day average= 49.2069
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

41
33
40
50
40

7/1/2008 12:52:57 PM

Facility = Arlington County WPCP
Chemical = TRC
Chronic averaging period = 4
WLAa = 19
WLAc = 11
Q.L. = 100
# samples/mo. = 30
# samples/wk. = 8

Summary of Statistics:

observations = 1
Expected Value = 200
Variance = 14400
C.V. = 0.6
97th percentile daily values = 486.683
97th percentile 4 day average = 332.758
97th percentile 30 day average= 241.210
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 16.0883226245855
Average Weekly limit = 9.59676626920107
Average Monthly LImit = 7.9737131838758

The data are:

200

Spreadsheet for determination of WET test endpoints or WET limits

Excel 97
Revision Date: 01/10/05
File: WETLIM10.xls
(MIX.EXE required also)

Enter data in the cells with blue type:

Entry Date:	04/24/08
Facility Name:	Arlington WPCP
VPDES Number:	**VA0025143**
Outfall Number:	**1**

Plant Flow:	**30**	MGD
Acute 1Q10:	**0.7**	MGD
Chronic 7Q10:	**0.6**	MGD

Acute Endpoint/Permit Limit — **Use as LC_{50} in Special Condition, as TUa on DMR**

ACUTE	**100% =**	**NOAEC**	**LC_{50} =**	**NA**	**% Use as**	**NA**	**TUa**
ACUTE WLAa		**0.307**	Note: Inform the permittee that if the mean of the data exceeds this TUa:	**1.0**	a limit may result using WLA.EXE		

Chronic Endpoint/Permit Limit — **Use as NOEC in Special Condition, as TUc on DMR**

CHRONIC	**1.491826178**	**TU_c**	**NOEC =**	**68**	**% Use as**	**1.47**	**TU_c**
BOTH*	**3.070000075**	**TU_c**	**NOEC =**	**33**	**% Use as**	**3.03**	**TU_c**
AML	**1.491826178**	**TU_c**	**NOEC =**	**68**	**% Use as**	**1.47**	**TU_c**

ACUTE WLAa,c	**3.07**	Note: Inform the permittee that if the mean of the data exceeds this TUc:	**1.0**
CHRONIC WLAc	**1.02**	a limit may result using WLA.EXE	
* Both means acute expressed as chronic			

% Flow to be used from MIX.EXE

	100	%	
	100	%	

Difuser /modeling study?

Enter Y/N	**N**	
Acute	1	:1
Chronic	1	:1

Are data available to calculate CV? (Y/N)	**N**	(Minimum of 10 data points, same species, needed)
Are data available to calculate ACR? (Y/N)	**N**	(NOEC<LC50, do not use greater/less than data)

Go to Page 2
Go to Page 3

IWC_a	97.71986971	%	Plant flow/plant flow + 1Q10
IWC_c	98.03921569	%	Plant flow/plant flow + 7Q10

NOTE: If the IWCa is >33%, specify the NOAEC = 100% test/endpoint for use

Dilution, acute	1.023333333		100/IWCa
Dilution, chronic	1.02		100/IWCc

WLA_a	0.307	Instream criterion (0.3 TUa) X's Dilution, acute
WLA_c	1.02	Instream criterion (1.0 TUc) X's Dilution, chronic
$WLA_{a,c}$	3.07	ACR X's WLA_a - converts acute WLA to chronic units

ACR -acute/chronic ratio	10	LC50/NOEC (Default is 10 - if data are available, use tables Page 3)
CV-Coefficient of variation	0.6	Default of 0.6 - if data are available, use tables Page 2)
Constants eA	0.4109447	Default = 0.41
eB	0.6010373	Default = 0.60
eC	2.4334175	Default = 2.43
eD	2.4334175	Default = 2.43 (1 samp) No. of sample 1

****The Maximum Daily Limit is calculated from the lowest LTA, X's eC. The LTAa,c and MDL using it are driven by the ACR.**

$LTA_{a,c}$	1.261600229	WLAa,c X's eA					
LTA_c	0.613058046	WLAc X's eB				Rounded NOEC's	%
MDL** with $LTA_{a,c}$	3.070000075	TU_c	NOEC =	32.573289	(Protects from acute/chronic toxicity)	NOEC = 33	%
MDL** with LTA_c	1.491826178	TU_c	NOEC =	67.031938	(Protects from chronic toxicity)	NOEC = 68	%
AML with lowest LTA	1.491826178	TU_c	NOEC =	67.031938	Lowest LTA X's eD	NOEC = 68	

IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU_c to TU_a

						Rounded LC50's	%
MDL with $LTA_{a,c}$	0.307000008	TU_a	LC50 =	325.732891	% Use NOAEC=100%	LC50 = NA	%
MDL with LTA_c	0.149182618	TU_a	LC50 =	670.319381	% Use NOAEC=100%	LC50 = NA	

Attachment 11

Page 2 - Follow the directions to develop a site specific CV (coefficient of variation)

IF YOU HAVE AT LEAST 10 DATA POINTS THAT ARE QUANTIFIABLE (NOT "<" OR ">") FOR A SPECIES, ENTER THE DATA IN EITHER COLUMN "G" (VERTEBRATE) OR COLUMN "J" (INVERTEBRATE). THE 'CV' WILL BE PICKED UP FOR THE CALCULATIONS BELOW. THE DEFAULT VALUES FOR eA, eB, AND eC WILL CHANGE IF THE 'CV' IS ANYTHING OTHER THAN 0.6.

Coefficient of Variation for effluent tests

CV = 0.6 (Default 0.6)

δ^2 = 0.3074847

δ = 0.554513029

Using the log variance to develop eA
(P. 100, step 2a of TSD)

Z = 1.881 (97% probability stat from table

A = -0.88929666

eA = 0.410944686

Using the log variance to develop eB
(P. 100, step 2b of TSD)

δ_4^2 = 0.086177696

δ_4 = 0.293560379

B = -0.50909823

eB = 0.601037335

Using the log variance to develop eC
(P. 100, step 4a of TSD)

δ^2 = 0.3074847

δ = 0.554513029

C = 0.889296658

eC = 2.433417525

Using the log variance to develop eD
(P. 100, step 4b of TSD)

n = **1** This number will most likely stay as "1", for 1 sample/month.

δ_n^2 = 0.3074847

δ_n = 0.554513029

D = 0.889296658

eD = 2.433417525

	Vertebrate IC_{25} Data or LC_{50} Data	LN of data	Invertebrate IC_{25} Data or LC_{50} Data	LN of data
	**********		**********	
1	0		0	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
St Dev	NEED DATA	NEED DATA	St Dev	NEED DATA NEED DATA
Mean	0	0	Mean	0 0
Variance	0	0.000000	Variance	0 0.000000
CV	0		CV	0

Page 3 - Follow directions to develop a site specific ACR (Acute to Chronic Ratio)

To determine Acute/Chronic Ratio (ACR), insert usable data below. Usable data is defined as valid paired test results, acute and chronic, tested at the same temperature, same species. The chronic NOEC must be less than the acute LC_{50}, since the ACR divides the LC_{50} by the NOEC. LC_{50}'s >100% should not be used.

Table 1. ACR using Vertebrate data

Set #	LC_{50}	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use
1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
				ACR for vertebrate data:			0

Table 1. Result:	Vertebrate ACR		0
Table 2. Result:	Invertebrate ACR		0
	Lowest ACR		Default to 10

Table 2. ACR using Invertebrate data

Set #	LC_{50}	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use
1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
				ACR for vertebrate data:			0

DILUTION SERIES TO RECOMMEND

Table 4.	Monitoring		Limit	
	% Effluent	TUc	% Effluent	TUc
Dilution series based on data mean	100	1.0		
Dilution series to use for limit			68	1.4705882
Dilution factor to recommend:	0.5		0.8246211	
Dilution series to recommend:	100.0	1.00	100.0	1.00
	50.0	2.00	82.5	1.21
	25.0	4.00	68.0	1.47
	12.5	8.00	56.1	1.78
	6.25	16.00	46.2	2.16
Extra dilutions if needed	3.12	32.05	38.1	2.62
	1.56	64.10	31.4	3.18

Convert LC_{50}'s and NOEC's to Chronic TU's for use in WLA.EXE

Table 3. ACR used: 10

	Enter LC_{50}	TUc	Enter NOEC	TUc
1		NO DATA		NO DATA
2		NO DATA		NO DATA
3		NO DATA		NO DATA
4		NO DATA		NO DATA
5		NO DATA		NO DATA
6		NO DATA		NO DATA
7		NO DATA		NO DATA
8		NO DATA		NO DATA
9		NO DATA		NO DATA
10		NO DATA		NO DATA
11		NO DATA		NO DATA
12		NO DATA		NO DATA
13		NO DATA		NO DATA
14		NO DATA		NO DATA
15		NO DATA		NO DATA
16		NO DATA		NO DATA
17		NO DATA		NO DATA
18		NO DATA		NO DATA
19		NO DATA		NO DATA
20		NO DATA		NO DATA

If WLA.EXE determines that an acute limit is needed, you need to convert the TUc answer you get to TUa and then an LC50, enter it here: NO DATA $\%LC_{50}$; NO DATA TUa

Cell: I9
Comment:
This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

Cell: K18
Comment: This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

Cell: J22
Comment: Remember to change the "N" to "Y" if you have ratios entered, otherwise, they won't be used in the calculations.

Cell: C40
Comment:
If you have entered data to calculate an ACR on page 3, and this is still defaulted to "10", make sure you have selected "Y" in cell E21

Cell: C41
Comment: If you have entered data to calculate an effluent specific CV on page 2, and this is still defaulted to "0.6", make sure you have selected "Y" in cell E20

Cell: L48
Comment:
See Row 151 for the appropriate dilution series to use for these NOEC's

Cell: G62
Comment:
Vertebrates are:
Pimephales promelas
Oncorhynchus mykiss
Cyprinodon variegatus

Cell: J62
Comment:
Invertebrates are:
Ceriodaphnia dubia
Mysidopsis bahia

Cell: C117
Comment: Vertebrates are:

Pimephales promelas
Cyprinodon variegatus

Cell: M119
Comment: The ACR has been picked up from cell C34 on Page 1. If you have paired data to calculate an ACR, enter it in the tables to the left, and make sure you have a "Y" in cell E21 on Page 1. Otherwise, the default of 10 will be used to convert your acute data.

Cell: M121
Comment: If you are only concerned with acute data, you can enter it in the NOEC column for conversion and the number calculated will be equivalent to the TUa. The calculation is the same: 100/NOEC = TUc or 100/LC50 = TUa.

Cell: C138
Comment: Invertebrates are:

Ceriodaphnia dubia
Mysidopsis bahia

Public Notice – Environmental Permit

PURPOSE OF NOTICE: To seek public comment on a draft permit from the Department of Environmental Quality that will allow the release of treated wastewater into a water body in Arlington County, Virginia.

PUBLIC COMMENT PERIOD: August 22, 2008 to 5:00 p.m. on September 22, 2008

PERMIT NAME: Virginia Pollutant Discharge Elimination System Permit – Wastewater issued by DEQ, under the authority of the State Water Control Board

APPLICANT NAME, ADDRESS AND PERMIT NUMBER: Arlington County Board
#1 Courthouse Plaza
Arlington, VA 22201
VA0025143

NAME AND ADDRESS OF FACILITY: The Arlington County WPCP
3402 South Glebe Road
Arlington, VA 22202

PROJECT DESCRIPTION: The Arlington County Board has applied for a reissuance of a permit for the public Arlington County WPCP. The applicant proposes to release treated sewage wastewaters from residential areas at a rate of 40 million gallons per day into a water body. Biosolids from the treatment process will be land applied. The facility proposes to release the treated sewage into Four Mile Run in Arlington County in the Potomac River/Four Mile Run/Pimmit Run Watershed. A watershed is the land area drained by a river and its incoming streams. The permit will limit the following pollutants to amounts that protect water quality: pH, $cBOD_5$, Total Suspended Solids, Total Phosphorus, E. Coli Bacteria, Dissolved Oxygen, Total Nitrogen, Total Kjeldahl Nitrogen, Ammonia as Nitrogen, Nitrite and Nitrate as Nitrogen, and Total Residual Chlorine. Additionally, this permit requires that Tetrachloroethylene, PCBs, and Total Recoverable Copper will be monitored.

The facility is subject to the requirements of 9 VAC 25-820 and has registered for coverage under the General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia. .

HOW TO COMMENT AND/OR REQUEST A PUBLIC HEARING: DEQ accepts comments and requests for public hearing by e-mail, fax or postal mail. All comments and requests must be in writing and be received by DEQ during the comment period. Submittals must include the names, mailing addresses and telephone numbers of the commenter/requester and of all persons represented by the commenter/requester. A request for public hearing must also include: 1) The reason why a public hearing is requested. 2) A brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requestor, including how and to what extent such interest would be directly and adversely affected by the permit. 3) Specific references, where possible, to terms and conditions of the permit with suggested revisions. DEQ may hold a public hearing, including another comment period, if public response is significant and there are substantial, disputed issues relevant to the permit.

CONTACT FOR PUBLIC COMMENTS, DOCUMENT REQUESTS AND ADDITIONAL INFORMATION: The public may review the documents at the DEQ-Northern Regional Office by appointment. Name: Anna T. Westernik Address: DEQ-Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193 Phone: (703) 583-3837 E-mail: atwesternik@deq.virginia.gov Fax: (703) 583-3841

Attachment 12

POTOMAC EMBAYMENTS WASTELOAD ALLOCATION STUDY

FINAL REPORT, VOLUME III:

SENSITIVITY STUDIES AND FINAL ANALYSES FOR THE FOUR MILE RUN, HUNTING CREEK AND NEABSCO CREEK EMBAYMENTS

A Staff Technical Analysis

Prepared for
STATE WATER CONTROL BOARD

Prepared by
NORTHERN VIRGINIA PLANNING DISTRICT COMMISSION

with Technical Assistance Provided by
CAMP DRESSER & McKEE

JUNE 30, 1988

Attachment 13

ABSTRACT

TITLE: Potomac Embayments Wasteload Allocation Study -- Final Report, Volume III

AUTHOR: Northern Virginia Planning District Commission

SUBJECT: The sensitivity studies and final analyses conducted for the Four Mile Run, Hunting Creek, and Neabsco Creek embayments, culminating in recommended effluent limits for treatment plant discharges to those embayments.

DATE: June 30, 1988

SOURCE OF COPIES: Northern Virginia Planning District Commission
7630 Little River Turnpike
Annandale, VA 22003

NUMBER OF PAGES:

ABSTRACT: Results of the sensitivity studies and final analyses conducted for the Four Mile Run, Hunting Creek, and Neabsco Creek embayments are presented. The sensitivity studies determine the sensitivity of embayment water quality to changes in parameters such as treatment plant wasteloads, Potomac main stem boundary conditions, benthic flux rates, and treatment plant discharge locations. Water quality projections from the sensitivity studies are compared to the water quality goals determined earlier in the study, in order to identify wasteload allocation alternatives to be studied in the final analyses. The final analyses include a comparison of costs and of pollutant flux into the Potomac mainstem for the selected alternatives, and an analysis of seasonal treatment plant effluent limits. The results of a recently completed study of dissolved oxygen in the upper Potomac Estuary are incorporated into the detailed studies for the Four Mile Run and Hunting Creek embayments. Based on the results of the final analyses, treatment plant effluent limits are recommended for the discharges to the embayments.

POTOMAC EMBAYMENTS WASTELOAD ALLOCATION STUDY
FINAL REPORT, VOLUME III:

Sensitivity Studies and Final Analyses for the
Four Mile Run, Hunting Creek, and Neabsco Creek Embayments

EXECUTIVE SUMMARY

In accordance with the regionally consistent methodology presented in the Volume I final report, NVPDC and CDM conduct sensitivity studies and final analyses for the Four Mile Run, Hunting Creek, and Neabsco Creek embayments. Modeling tools developed by the Virginia Institute of Marine Science are used to predict the embayment water quality impacts of alternative treatment plant wasteloads. The modeling results are compared to water quality goals developed and presented in the Volume I final report to determine appropriate treatment plant effluent limits.

The sensitivity studies predict the extent to which embayment water quality would be affected by changes in parameters such as treatment plant loading, Potomac main stem boundary conditions, benthic flux rates, and treatment plant discharge location. After comparing the modeling results to the appropriate water quality goals, several different wasteload allocation alternatives for each embayment are selected for further analysis.

For the alternatives selected in the sensitivity studies, the final analyses include a comparison of wastewater treatment costs and of pollutant exchange between the embayment and the Potomac main stem. In addition, analyses of seasonal treatment limits for phosphorus and unoxidized nitrogen are conducted. The analysis of seasonal phosphorus removal is limited by a lack of data; as a result, no recommendations are made regarding the feasibility of seasonal phosphorus limits. The analyses for the Hunting Creek and Four Mile Run embayments incorporate the results of a recently completed Metropolitan Washington Council of Governments study of dissolved oxygen in the upper Potomac Estuary.

Based on the sensitivity studies and final analyses, the following effluent limits for dissolved oxygen (DO), 5-day carbonaceous biochemical oxygen demand (CBOD5), total Kjeldahl nitrogen (TKN), and total phosphorus (TP) are recommended for protection of embayment water quality:

EMBAYMENT	TREATMENT PLANT	PLANT FLOW (MGD)	RECOMMENDED EFFLUENT CONCENTRATION (mg/l) DO	CBOD5	TKN	TP
Four Mile Run	Arlington	40.0	6.0	10.0	---	1.00
Hunting Creek	Alexandria	54.0	7.6*	3.0	---	1.00
				-or-		
			7.6*	10.0	1.0**	1.00
Neabsco Creek	Dale City #1	4.0	6.0	10.0	---	1.00
	Dale City #8	2.0	6.0	10.0	---	1.00
	Mooney	20.0	6.0	10.0	---	1.00

*April 1 through October 31 only; limit of 6.0 mg/L November 1 through March 31

**April 1 through October 31 only; no TKN limit November 1 through March 31

To protect the main stem of the Potomac Estuary, an interim total phosphorus limit of 0.18 mg/l is regionally accepted as presented in the Interim Control Policy of the 1986 Supplement to the Metropolitan Washington 208 Plan. Therefore, at the present time, the more restrictive constraint on total phosphorus is the 0.18 mg/l limit for protection of the main stem of the Potomac. As indicated in the 208 Plan Supplement, long-term Potomac studies now under way will better define the total phosphorus limits required for protection of the Potomac main stem.

1.0 INTRODUCTION

1.1 BACKGROUND

In the late 1960's and early 1970's, it became clear that water quality in the tidal Potomac River was in a state of eutrophication. This condition was characterized by large concentrations of nutrients (such as nitrogen and phosphorus), excessive algal productivity, occasional episodes of oxygen depletion brought on by decomposition of biomass, and a reduction in the number of plant and animal species present in the river. Eutrophication was generally brought on by the wasteloads contributed by wastewater treatment plants, combined sewer overflows, and nonpoint source runoff, both in the local area and in upstream locations.

In response to deteriorating water quality, particularly in the Potomac Embayments, Virginia's State Water Control Board (SWCB) adopted the Potomac Embayment Standards in 1971. These standards were applied as permit limits to the Virginia plants in operation near the embayments, some of which have since been closed. The Potomac Embayment Standards, which were developed based on the limited analytical techniques available at the time, necessitated the use of advanced wastewater treatment processes.

As wastewater treatment plant operators moved toward meeting these standards, it became apparent that compliance would be very costly, yet water quality conditions had already improved significantly. In 1979, Northern Virginia localities questioned the need for such stringent standards. The SWCB immediately embarked on a program of reevaluating the Potomac Embayment Standards, based on a process for determining the river's capacity to assimilate effluent wasteloads.

Working closely with the SWCB, the Virginia Institute of Marine Science (VIMS) studied the tidal circulation and water quality processes taking place in each embayment in order to develop computer simulation models of each. Each of these models was calibrated and verified by VIMS and has

been thoroughly reviewed by the SWCB, the Environmental Protection Agency, and others, in order to ensure its validity.

In early 1985, the SWCB made a public request for proposals to conduct a wasteload allocation study of seven Virginia embayments using the models developed by VIMS. This was to be the final stage in the technical studies needed for the Board's reevaluation of the Potomac Embayment standards. The Northern Virginia Planning District Commission and its consultant, Camp Dresser & McKee, were chosen to conduct the study.

1.2 STUDY OBJECTIVE

A wasteload allocation study of seven Northern Virginia embayments of the Potomac Estuary was performed by the Northern Virginia Planning District Commission (NVPDC) with technical assistance provided by Camp Dresser & McKee (CDM). The objective of the study was to recommend water quality-based treatment limits for 10 wastewater treatment plants discharging into or immediately upstream of the embayments. The recommended allocations will serve as a basis for decisions to be made by the SWCB in developing permit limits for carbonaceous biochemical oxygen demand, unoxidized nitrogen, and phosphorus.

1.3 STUDY AREA

The geographic area included within the study stretches from Arlington County south to Stafford County. Each of the seven Virginia embayments being studied--Four Mile Run, Hunting Creek, Little Hunting Creek, Gunston Cove, Belmont-Occoquan Bay, Neabsco Creek, and Aquia Creek--receives discharges from one or more wastewater treatment plants. Figure 1-1 shows the location of the Virginia embayments and includes the wastewater treatment plants which are considered in the wasteload allocation study. They are: Arlington, Alexandria, Little Hunting Creek, Lower Potomac, Lorton, Harbor View, Dale City 1, Dale City 8, H.L. Mooney, and Aquia.

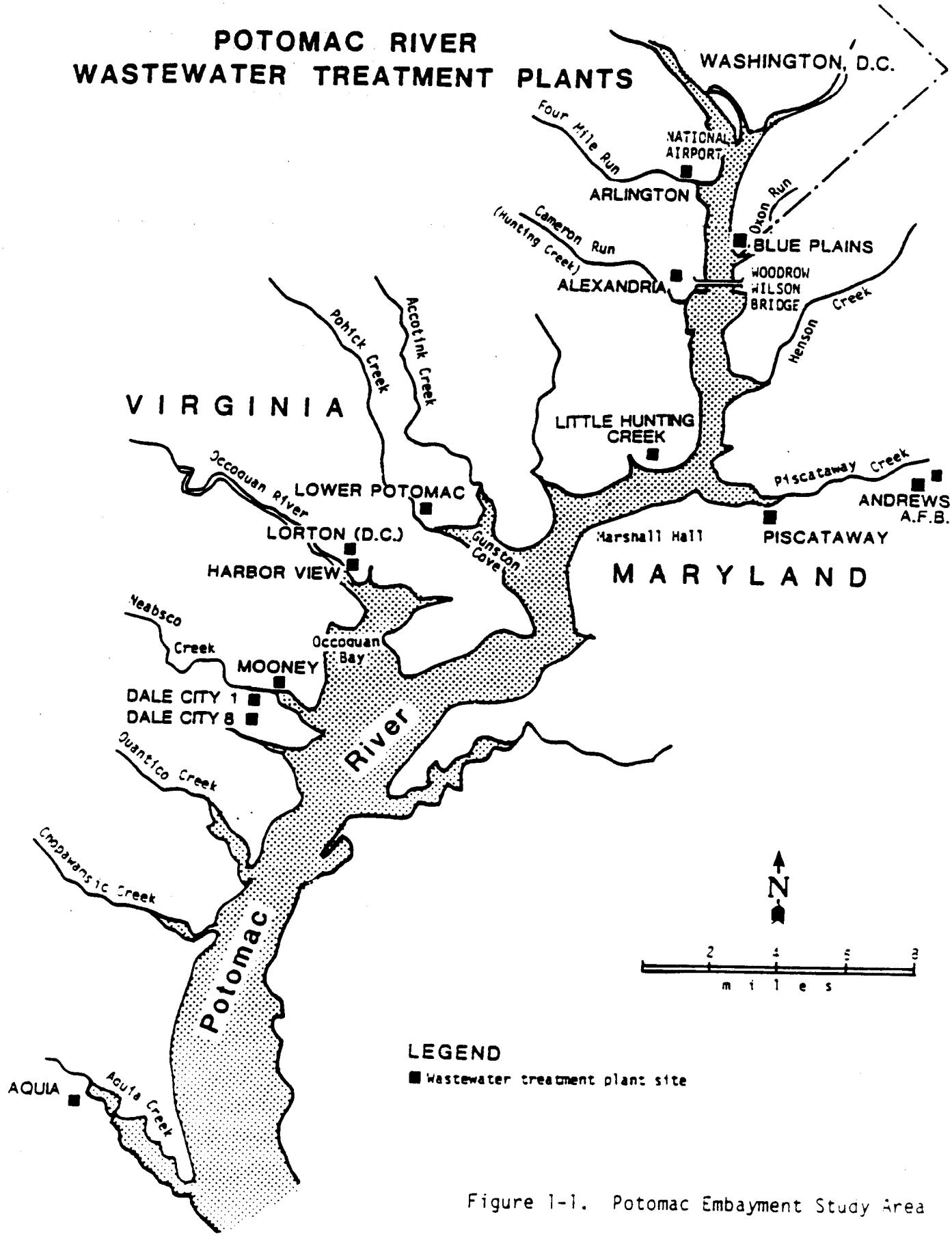


Figure 1-1. Potomac Embayment Study Area

1.4 STUDY SCOPE

In the initial phase of the study, the modeling tools to be used in performing the wasteload allocation study were obtained and tested. Embayment hydrodynamics and water quality models developed by the Virginia Institute of Marine Science (VIMS) were loaded onto the mainframe computer used by the NVPDC and these computer codes were modified as necessary for successful executions. The models were designed to simulate tidal transport and transformation of pollutants within the embayments, and exchanges with the main stem Potomac Estuary. During the course of the study, several modifications were made to the computer codes of certain models to enhance their capability and to correct minor errors.

In the next phase of the study, a regionally consistent methodology for wasteload allocation analysis was developed which set the stage for the detailed scope of work. The methodology defined the modeling approach and also the general procedures for establishing design conditions, defining water quality goals, performing sensitivity studies and completing detailed wasteload allocation analyses. As part of the methodology, specific data for computer model application were developed and included the following: nonpoint source loadings, Potomac main stem boundary conditions, and design tides, streamflows, water temperature, and solar radiation.

Water quality goals were then developed for use as evaluation criteria in screening wasteload allocation alternatives during the sensitivity analyses and the final wasteload allocation analyses. The water quality goals were focused on dissolved oxygen, and on chlorophyll-a levels required for eutrophication management, and also considered pollutant mass flux from the embayments into the Potomac Estuary main stem. The dissolved oxygen goals are consistent with the Virginia state water quality standards, and specific chlorophyll-a goals were developed for each embayment.

After the goals and methodology were established, sensitivity analyses were performed to evaluate the impacts of different parameters on water quality at critical locations within each embayment. The different parameters included various wastewater treatment plant loadings, boundary conditions,

benthic flux rates and wastewater treatment plant discharge locations. Conformance to the water quality goals was considered as part of the evaluation of impacts. The sensitivity studies were the basis for selection of the most promising wasteload allocation alternatives for final analyses.

The final analysis phase of the project used the wasteload allocation alternatives as a base and expanded the study to include analyses of year-round and seasonal effluent levels, evaluation of pollutant flux to the Potomac Estuary main channel and generalized cost comparisons of wasteload allocation alternatives. In the final analysis, treatment limits for each of the 10 wastewater treatment plants are recommended for biochemical oxygen demand, dissolved oxygen, unoxidized nitrogen, and phosphorus.

1.5 PUBLIC PARTICIPATION IN STUDY

From the onset, the NVPDC recognized that public participation would be an essential element in the success of this study. It was apparent that the determination of wasteload allocations for the dischargers to the Virginia embayments could raise complex interjurisdictional issues, and that the study would benefit from a forum for resolution of the wastewater management issues that could arise. It was determined that this forum should provide an opportunity for discussion of local, state, and metropolitan perspectives of water quality issues in the upper Potomac Estuary, as well as feedback and guidance on the study methodology and products. In addition, it was apparent that the determination of wasteload allocations would raise issues of concern to the general public and that the study would benefit from an opportunity for the public to follow the progress of the study and to express its concerns.

With the authority granted by its Commission in Resolution No. 85-55, the NVPDC staff organized and conducted a publicly advertised meeting regarding the wasteload allocation study. The meeting was held on July 17, 1985, and included 16 attendees in addition to a panel consisting of several Commissioners, representatives from the NVPDC and CDM staffs, and a

representative of the SWCB. At the meeting, the panel presented background information on water quality in the upper Potomac Estuary, outlined the objectives of the study, described how these objectives would be achieved, and answered questions from the audience.

With the authority granted by its Commission in Resolution 85-46, the NVPDC staff formed the Northern Virginia Embayment Standards Technical Advisory Committee (NVESTAC) to provide a forum for evaluating and guiding the progress of the study, and for resolving related wastewater management issues. Specifically, the resolution states that the NVESTAC's purpose is to provide input during all study phases and to review all major assumptions and procedures, including:

- The regional methodology for the wasteload allocation analysis;
- The wasteload allocation scenarios to be tested during sensitivity analysis;
- The results of the sensitivity analysis and selection of the wasteload allocation alternatives to be tested in detail;
- The water quality goals to be used in the evaluation of embayment model projections;
- The recommended permit levels for each wastewater treatment plant; and
- The draft and final reports, including interim reports.

Those invited to participate included the chief administrative officers (or their alternates) and wastewater management agency heads of Arlington, Fairfax, Prince William and Stafford Counties, the Cities of Fairfax, Alexandria, and Falls Church, and the Town of Vienna, as well as one representative each from the SWCB, the Metropolitan Washington Council of Governments, the Interstate Commission on the Potomac River Basin, the

RADCO Planning District Commission, the Washington D.C. Department of Corrections, Dale Service Corporation, and Colchester Public Service Corporation. Participating members of the committee are listed in the roster which immediately precedes the table of contents in this report.

Minutes of the October 8, 1986, February 23, 1988 and April 19, 1988 meetings of the NVESTAC are found in Appendix A of this report. These three NVESTAC meetings are particularly germane to the sensitivity studies and final analyses described in the Volume III report. At the October 8, 1986 meeting, the results of the sensitivity studies were presented, and comments were solicited from the NVESTAC. At the February 23, 1988 meeting, the results of the final analyses for Neabsco Creek were presented, and comments were solicited from the NVESTAC. The final results for Four Mile Run and Hunting Creek were presented at the April 19, 1988 meeting. Written comments submitted to NVPDC regarding the sensitivity studies and final analyses presented in the Volume III report are given in Appendices B and C.

Beyond the public meeting, involvement of interested persons was maintained throughout the course of the study through direct mailings of NVESTAC meeting notices, agendas, minutes and status reports. The list of participants includes over 80 individuals affiliated with federal and state agencies, environmental groups, and civic groups, as well as members of Congress and interested private citizens.

Throughout the study, the NVPDC staff continued to meet with local staff representatives on an individual basis. This setting was used primarily for discussing specific topics which were not of general interest to the NVESTAC membership. Individual meetings have been held with wastewater management officials from Arlington County, Fairfax County, Stafford County, the Alexandria Sanitation Authority and the Prince William County Service Authority.

1.6 FORMAT OF FINAL REPORT

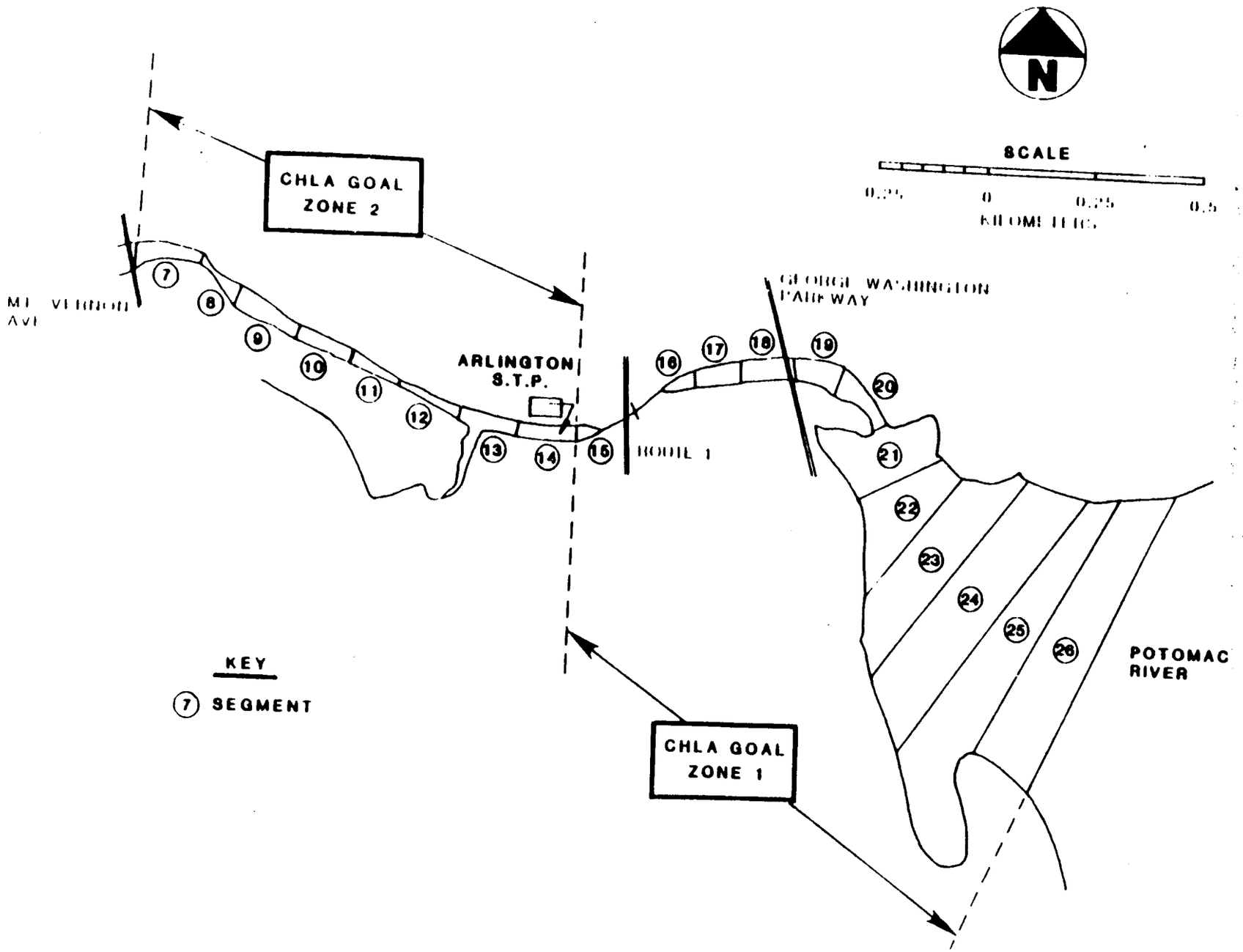
The final report for the Potomac Embayments Wasteload Allocation Study is divided into three volumes. Volume I contains a description of the overall methodology, the development of the data base required for model simulation and the water quality goals used to screen the various wasteload allocation scenarios. Volume II presents the sensitivity and final analyses for the Little Hunting Creek, Gunston Cove, Belmont-Occoquan Bay and Aquia Creek embayments. This volume, Volume III, presents the sensitivity and final analyses for the Four Mile Run, Hunting Creek and Neabsco Creek embayments. The sensitivity studies include the analysis of different wasteload scenarios, boundary conditions, benthic flux rates and treatment plant discharge locations. Several wasteload allocation scenarios, selected as a result of the sensitivity studies, are then evaluated in the final analysis which includes consideration of seasonal effluent limits, pollutant flux to the Potomac main stem and generalized cost comparisons. In Volumes II and III, specific effluent limits are recommended for each of the wastewater treatment plants discharging to the seven embayments.

5.0 SENSITIVITY RESULTS FOR FOUR MILE RUN

Four Mile Run discharges into the upper Potomac Estuary just below Washington National Airport. Figure 1-1 shows the location of Four Mile Run and the other six embayments. The portion of Four Mile Run included in the study, as developed for the VIMS model, encompasses the tidal embayment which extends from the George Washington Parkway to the Potomac and a upstream reach which is characterized as a transition segment from the free-flowing stream to the tidal embayment. Figure 5-1 presents a map of the model segmentation of Four Mile Run. The map also includes the designation of chlorophyll-a goal zones which will be discussed as part of the eutrophication analysis. The only point source to Four Mile Run is the Arlington WWTP which discharges into the Run just upstream of the Route 1 crossing.

The Arlington WWTP has a design capacity of 30 mgd. The activated sludge secondary treatment process is followed by advanced wastewater treatment with chemical addition and flocculation units. Multi-media filtration units and carbon adsorption are provided to achieve final removal of oxygen demanding materials and suspended solids followed by disinfection by sodium hypochlorite. The plant is equipped to perform breakpoint chlorination for nutrient removal, but this process is not being used. All model projections presented in the sensitivity analysis are based on the 30 mgd WWTP discharge.

The Four Mile Run model developed by VIMS has been modified for the sensitivity analysis under this present study. The original model executed under the present low flow design conditions predicted large algal growth and subsequently large DO concentrations in the upstream region of Four Mile Run. Historically such high algal concentrations are not noted to occur in that area of the Run. It appears that the original model inaccurately represented higher water depths above the WWTP discharge than would actually exist according to the Corps of Engineers' design drawings for the flood control channel in the upper reaches.


N
SCALE
0.25
0
0.25
0.5
KILOMETERS
CHLA GOAL ZONE 2
CHLA GOAL ZONE 1
MT VERNON AVE
ARLINGTON S.T.P.
ROUTE 1
GEORGE WASHINGTON PARKWAY
POTOMAC RIVER
KEY
(7) SEGMENT

Changes to the hydrodynamics model were made incorporating the Corps of Engineers channel bottom elevations. This modified model eliminates the large volumes in segments 7 to 13 and produces the flushing effects in that region which would actually occur. As a check on the modified model, the calibration data set was simulated showing only minimal changes to the results. Therefore, the modified model has been acepted by the SWCB for use in the wasteload allocation analysis of the Four Mile Run embayment.

5.1 WASTELOAD SCENARIOS

The four alternative wasteload scenarios selected for analysis include the Potomac Embayment Standards, the Consent Order and the State/EPA Interim Control Decision with and without nitrification. The effluent concentrations for modeled water quality parameters are presented in Table 5-1 for each of the four alternative scenarios. The appropriate Potomac Estuary boundary condition is chosen for each scenario as discussed in Section 3.4.

The daily minimum dissolved oxygen, the minimum daily average dissolved oxygen and the maximum daily average chlorophyll-a for both chlorophyll-a management zones are given in Table 5-2 to show the embayment response to each of the four wasteload scenarios. The daily minimum concentration is the lowest DO value which occurs during the day and this value is used to compare to the State's DO standard of 4.0 mg/L. The minimum daily average DO is the lowest daily average simulated at a model segment throughout the embayment and this value is used for comparison to the State's daily average DO standard of 5.0 mg/L. The State's dissolved oxygen standard of a minimum DO of 4.0 mg/L and an average daily value of 5.0 mg/L are not violated by the four wasteload scenarios. The Potomac Embayment Standards, which reflect nitrification and a low CBOD5 of 3.0 mg/L, produce the largest dissolved oxygen concentrations within Four Mile Run.

The lowest dissolved oxygen values are produced by the Interim Control Decision without nitrification which has a CBOD5 of 10 mg/L. For Four Mile Run, dissolved oxygen concentrations do not vary significantly for discharges with or without nitrification as shown in Table 5-2 for the Interim Control Decision with and without nitrification. The difference in the

TABLE 5-1

ARLINGTON
EFFLUENT CONCENTRATION FOR ALTERNATIVE WLA SCENARIOS

Wasteload Scenario	Effluent Concentration (mg/l)						
	Org. N	NH3	NO2+ NO3	Org. P	Ortho-P	CBOD5	DO
Potomac Embayment Standards	0.0	1.0	19.0	0.02	0.18	3.0	6.0
Consent Order	1.4	7.8	11.1	0.10	0.90	8.0	6.0
Interim Contr·· Decision (With Nitrifi ·ion)	0.0	1.0	19.0	0.02	0.16	10.0	6.0
Interim Contr Decision Without Nitri··cation	0.0	20.0	0.0	0.02	0.16	10.0	6.0

TABLE 5-2

FOUR MILE RUN
WATER QUALITY MODEL PROJECTIONS FOR ALTERNATIVE WLA SCENARIOS

Wasteload Scenario	DO (mg/l)		CHLA (ug/l)	
	Daily Minimum	Min. Daily Avg.	Zone 1 Max. Daily Avg.	Zone 2 Max. Daily Avg.
Potomac Embayment Standards	5.7 (13)[1]	6.0 (14)	70 (26)	2 (13)
Consent Order	5.1 (13)	5.6 (13)	74 (26)	2 (13)
Interim Control Decision (with Nitrification)	5.0 (13)	5.5 (13)	69 (26)	2 (13)
Interim Control Decision Without Nitrification	4.8 (13)	5.4 (13)	69 (26)	2 (13)

[1] Numbers in parenthesis denote location of constituent concentration by model segment.

minimum daily average DO is only 0.1 mg/L and the daily minimum DO only differs by 0.2 mg/L. Figure 5-2 shows the average daily dissolved oxygen profile for the four different wasteload scenarios. As indicated in Table 5-2 the minimum dissolved oxygen concentrations are located in the upper portion of the Run near the WWTP discharge. The dissolved oxygen increases towards the mouth as a function of the Potomac boundary condition and the high chlorophyll-a concentrations near the mouth of the embayment.

As developed in the Water Quality Goals report for Task 4, chlorophyll-a goals are set for two different management zones as shown in Figure 5-1. For the downstream zone 1 the goal is 80 ug/L and for the upstream zone 2 the goal is 15 ug/L. For each of the wasteload scenarios the chlorophyll-a concentration at the Potomac boundary, which is 80 ug/L, dominates the chlorophyll-a concentrations in the downstream area of the embayment. The no further deterioration goal in zone 1 is not exceeded by the wasteload scenarios which produce concentrations from 69 to 74 ug/L of chlorophyll-a. Very small concentrations of chlorophyll-a are produced in the upstream zone with a maximum chlorophyll-a concentration in zone 2 of 2 ug/L. The chlorophyll-a profile for each of the four wasteload scenarios is presented in Figure 5-3. This figure shows no change in the upstream chlorophyll-a concentrations with only a small variation in concentrations near the mouth for the different wasteload scenarios.

5.2 POTOMAC ESTUARY BOUNDARY CONDITIONS

Three chlorophyll-a Potomac boundary concentrations are studied to determine the dissolved oxygen and chlorophyll-a response in the embayment for the Interim Control Decision with nitrification (NH3=1.0 mg/L, TP=0.18 mg/L, CBOD5=10.0 mg/L, DO=6.0 mg/L) and without nitrification (NH3=20.0 mg/L others same). The chlorophyll-a concentrations at the Potomac boundary include the design condition of 80 ug/L and concentrations of 100 and 50 ug/L. Table 5-3 presents the embayment response for dissolved oxygen, and chlorophyll-a in each of the two chlorophyll-a management zones. Changes to the chlorophyll-a concentrations at the Potomac boundary do not have a significant effect on the daily minimum and minimum daily average dissolved oxygen concentrations in Four Mile Run. The dissolved

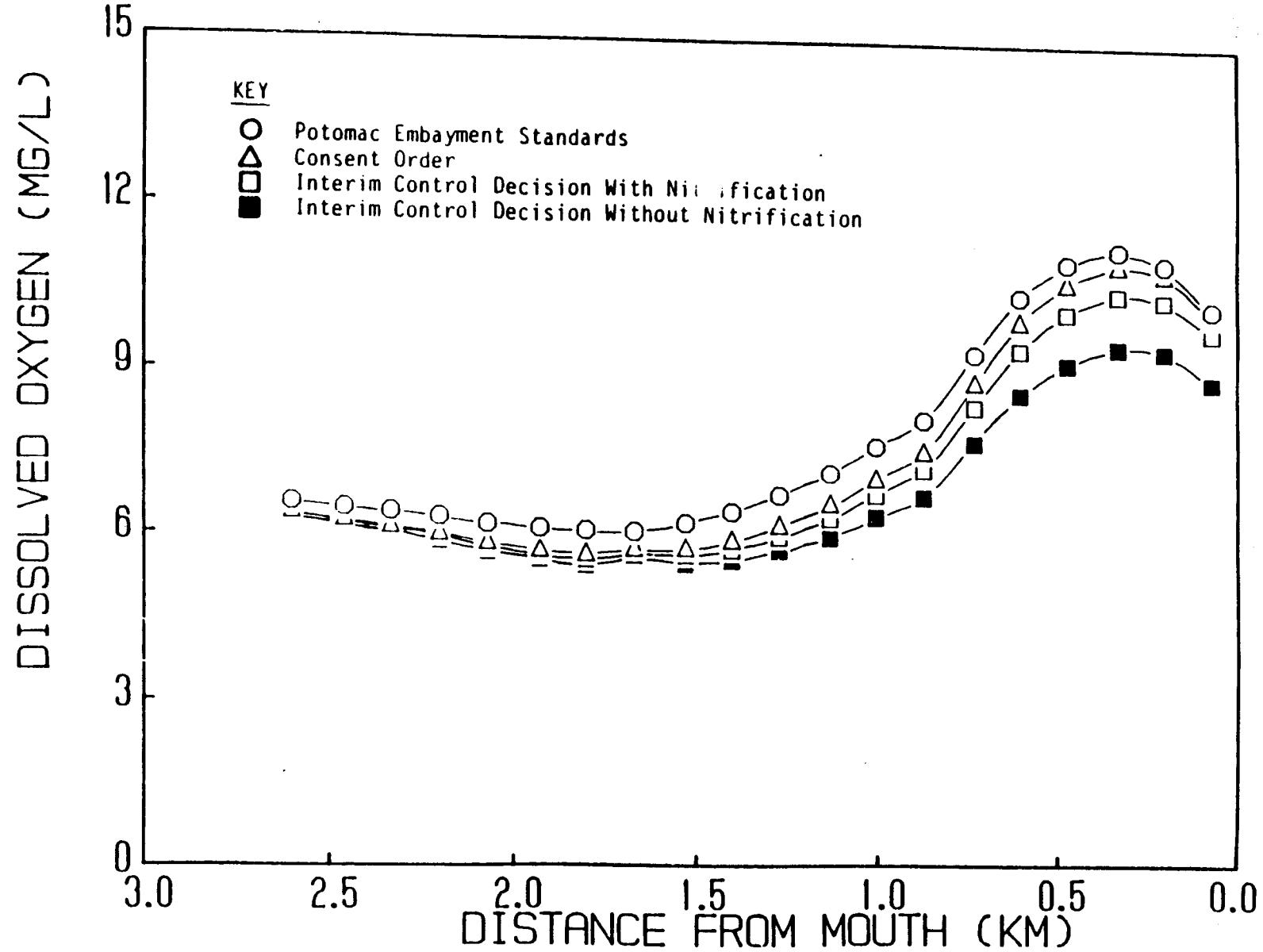


Figure 5-2. Four Mile Run, Simulated Daily Average Dissolved Oxygen for Different Wasteload Scenarios

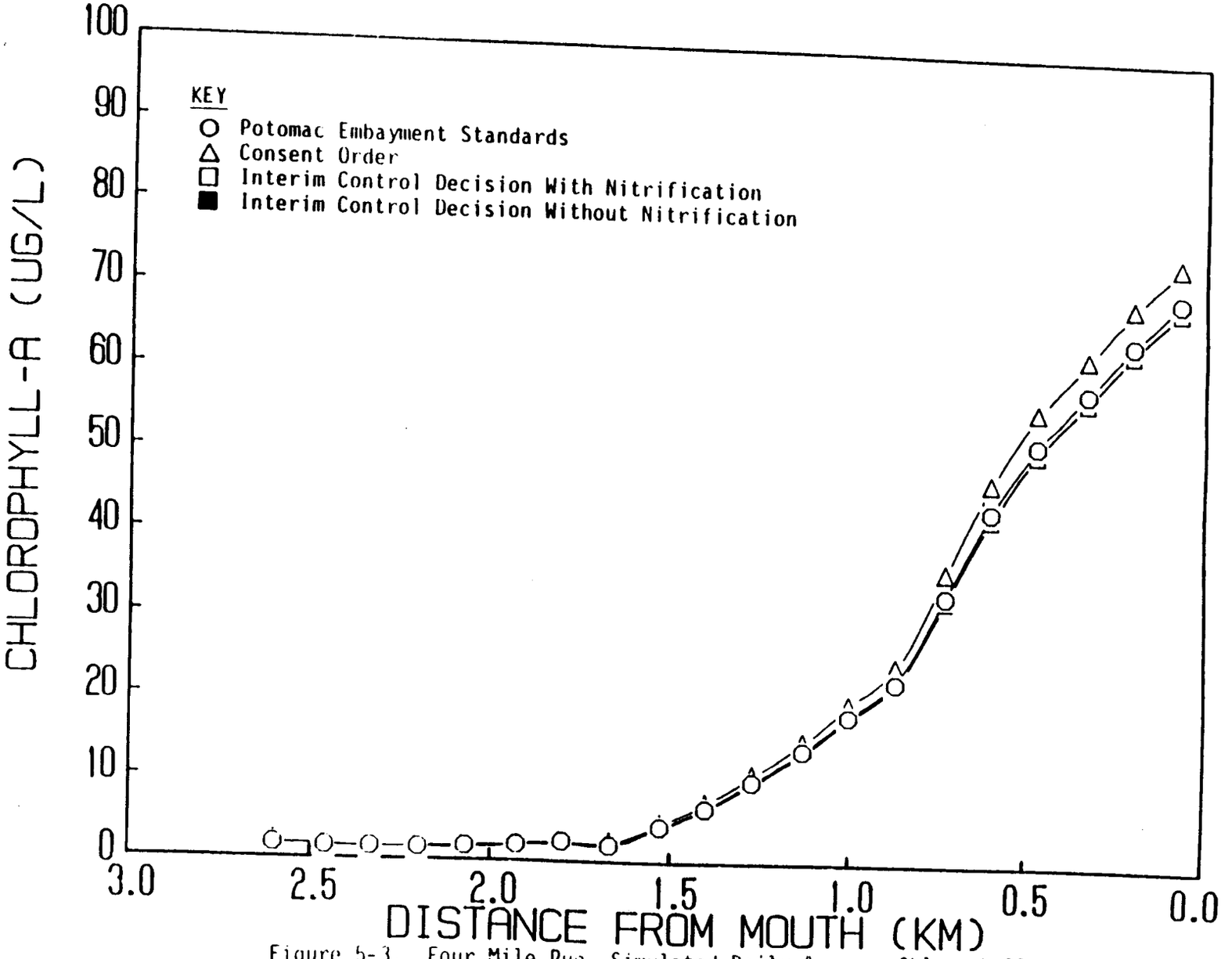


Figure 5-3. Four Mile Run, Simulated Daily Average Chlorophyll-a

TABLE 5-3

FOUR MILE RUN
WATER QUALITY MODEL PROJECTIONS FOR ALTERNATIVE
CHLOROPHYLL-A BOUNDARY CONDITIONS

Wasteload Scenario	Boundary Chla (ug/L)	DO (mg/l) Daily Minimum	DO (mg/l) Min. Daily Avg.	CHLA (ug/l) Zone 1 Max. Daily Avg.	CHLA (ug/l) Zone 2 Max. Daily Avg.
Interim Control Decision With Nitrification	100	5.0 (13)[1]	5.6 (13)	83 (26)	2 (13)
	80[2]	5.0 (13)	5.5 (13)	69 (26)	2 (13)
	50	4.9 (13)	5.5 (15)	47 (26)	2 (13)
Interim Control Decision Without Nitrification	100	4.9 (13)	5.5 (13)	83 (26)	2 (13)
	80[2]	4.8 (13)	5.4 (13)	69 (26)	2 (13)
	50	4.8 (13)	5.3 (13)	47 (26)	2 (13)

[1]Numbers in parenthesis denote location of constituent concentrations by model segment

[2]Design boundary condition.

oxygen concentrations in the upper portion of Four Mile Run do not vary significantly because the chlorophyll-a in that portion does not vary as a function of the boundary chlorophyll-a. However, dissolved oxygen concentrations do vary as a function of the boundary chlorophyll-a in the downstream reaches of the Run. The dissolved oxygen profile plots for various boundary conditions are given in Figures 5-4 and 5-5 for the Interim Control Decision with and without nitrification, respectively.

The maximum daily average chlorophyll-a concentrations in zone 1 directly reflect the Potomac Estuary boundary conditions as shown in Table 5-3. The chlorophyll-a concentrations in zone 2 are minimally affected as the maximum daily averages remain at 2 ug/L for all scenarios shown in Table 5-3. In zone 2, the chlorophyll-a goals are met for all wasteload scenarios and chlorophyll-a boundary conditions. The zone 1 goal is violated only if the chlorophyll-a boundary is as high as 100 ug/L.

Figures 5-6 and 5-7 present the chlorophyll-a profiles for the three boundary conditions for the Interim Control Decision with and without nitrification, respectively. These figures show that the downstream area of Four Mile Run is very sensitive to the chlorophyll-a concentrations at the Potomac boundary and that the upstream area is insensitive to the changes in chlorophyll-a at the Potomac boundary.

5.3 BENTHIC FLUX RATES

The sensitivity of the embayment response to varying benthic flux rates is performed by comparing the calibrated rates to an increase and decrease of 30 percent of the calibrated rates. The baseline scenario for this analysis is the Interim Control Decision with nitrification (NH3 = 1.0 mg/L, TP = 0.18 mg/L, CBOD5 = 10.0 mg/L, DO = 6.0 mg/L) and the PEM design chlorophyll-a Potomac Estuary boundary is 80 ug/L. For Four Mile Run calibration rates were established for ammonia and sediment oxygen demand but not for orthophosphorus. Table 5-4 presents the embayment response for dissolved oxygen and chlorophyll-a for the changes to the ammonia and SOD benthic flux rates.

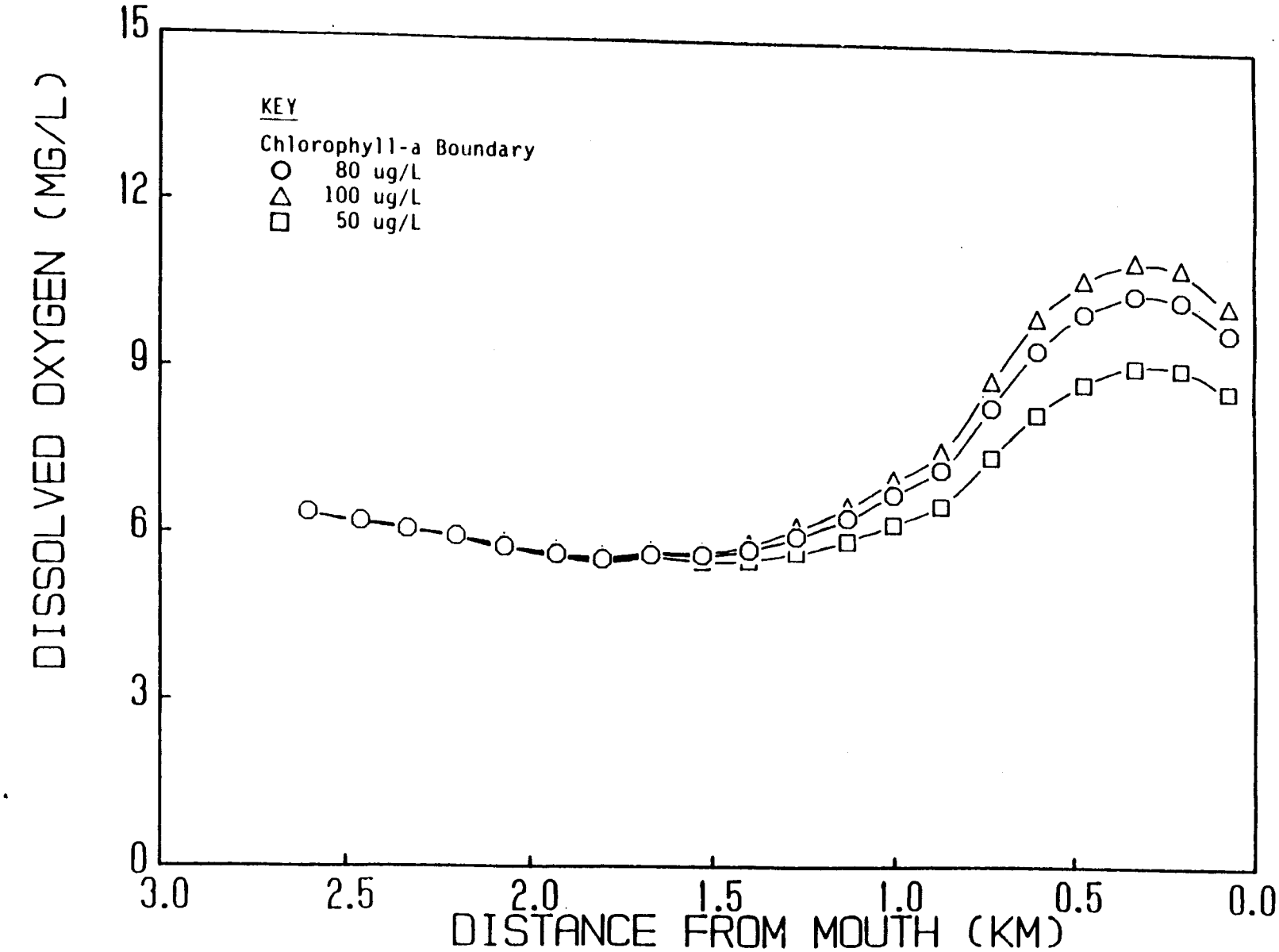


Figure 5-4. Four Mile Run, Simulated Daily Average Dissolved Oxygen for Different Boundary Conditions; Interim Control Decision with Nitrification

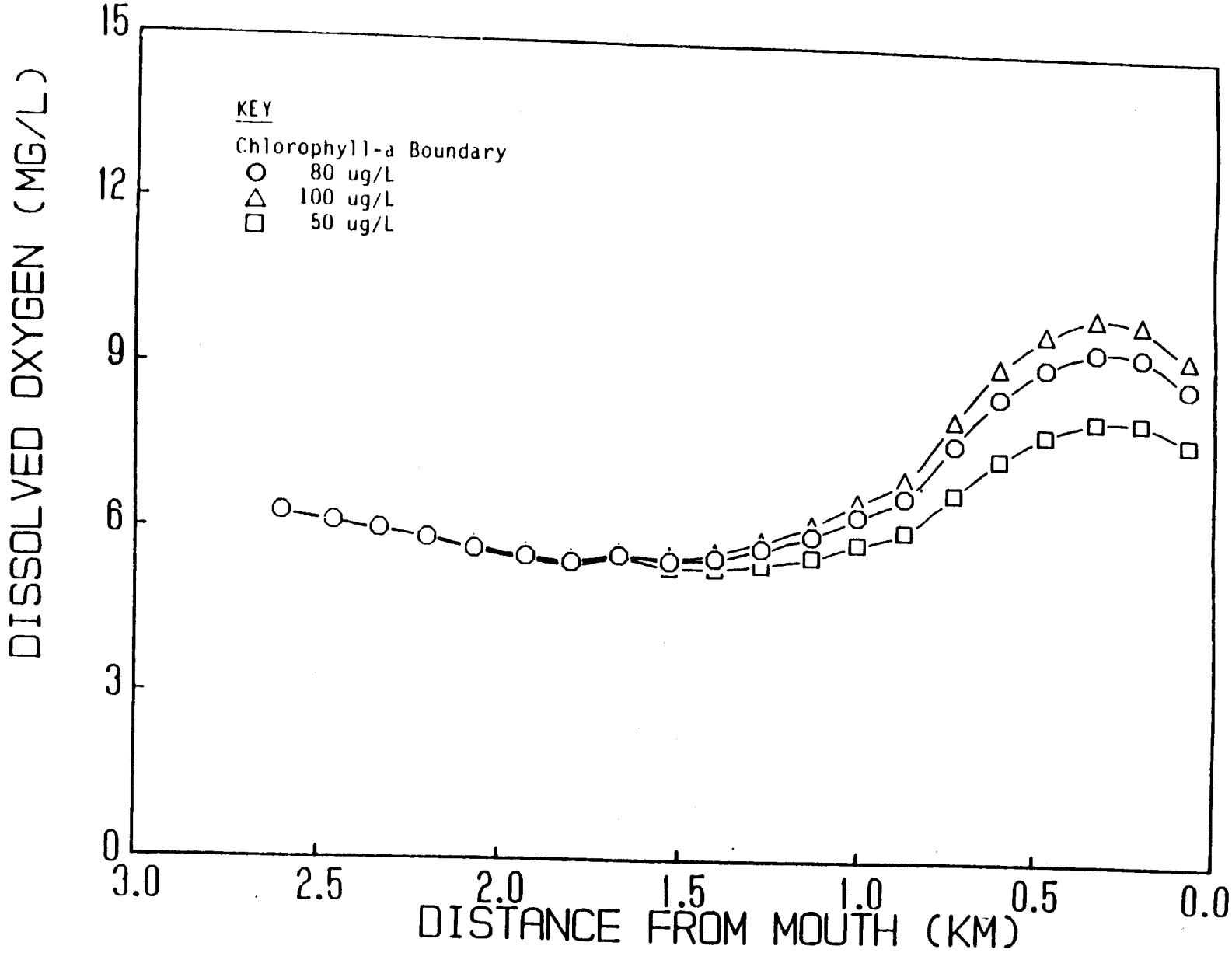


Figure 5-5. Four Mile Run, Simulated Daily Average Dissolved Oxygen for Different

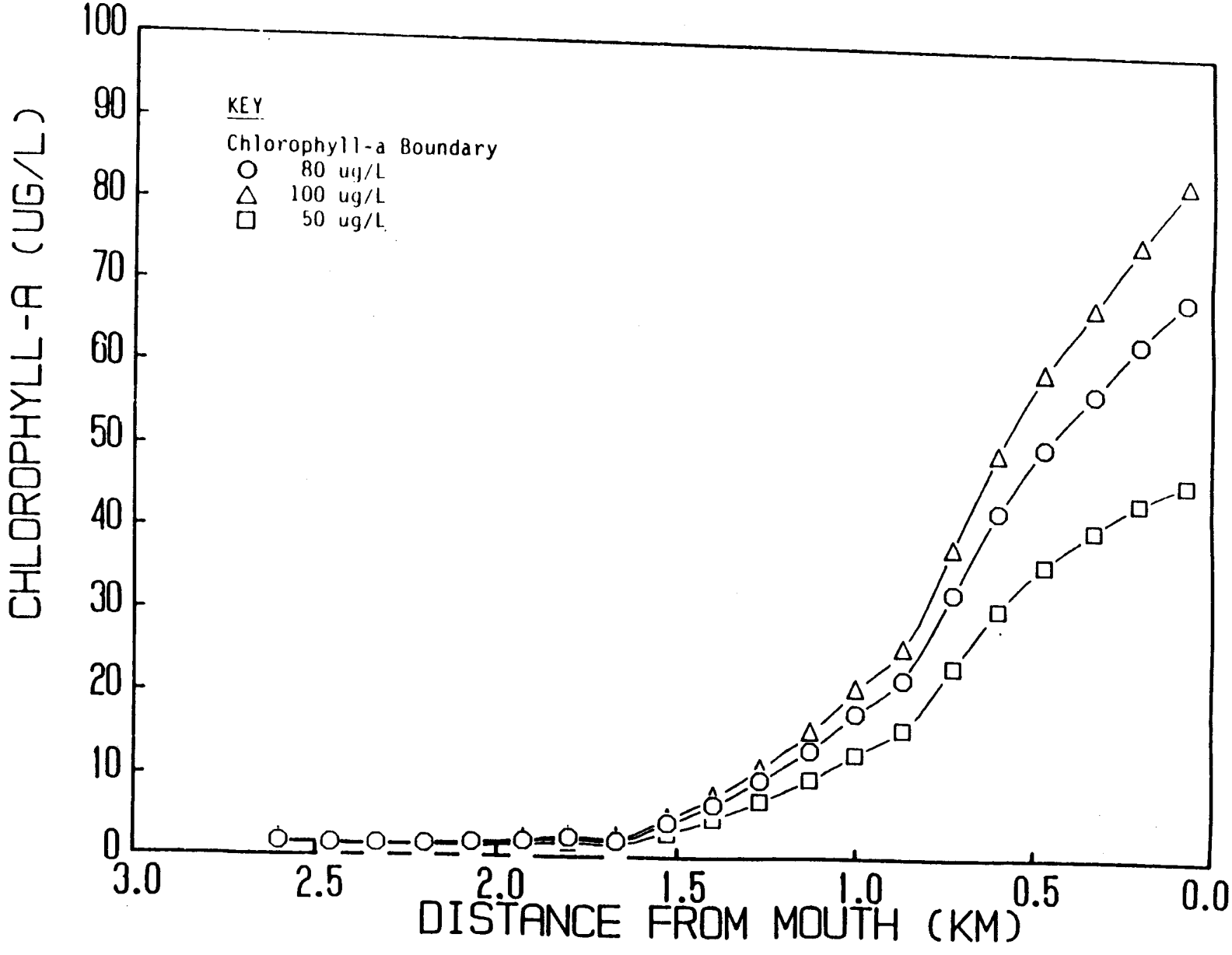


Figure 5-6. Four Mile Run, Simulated Daily Average Chlorophyll-a for Different Boundary Conditions; Interim Control Decision with Nitrification

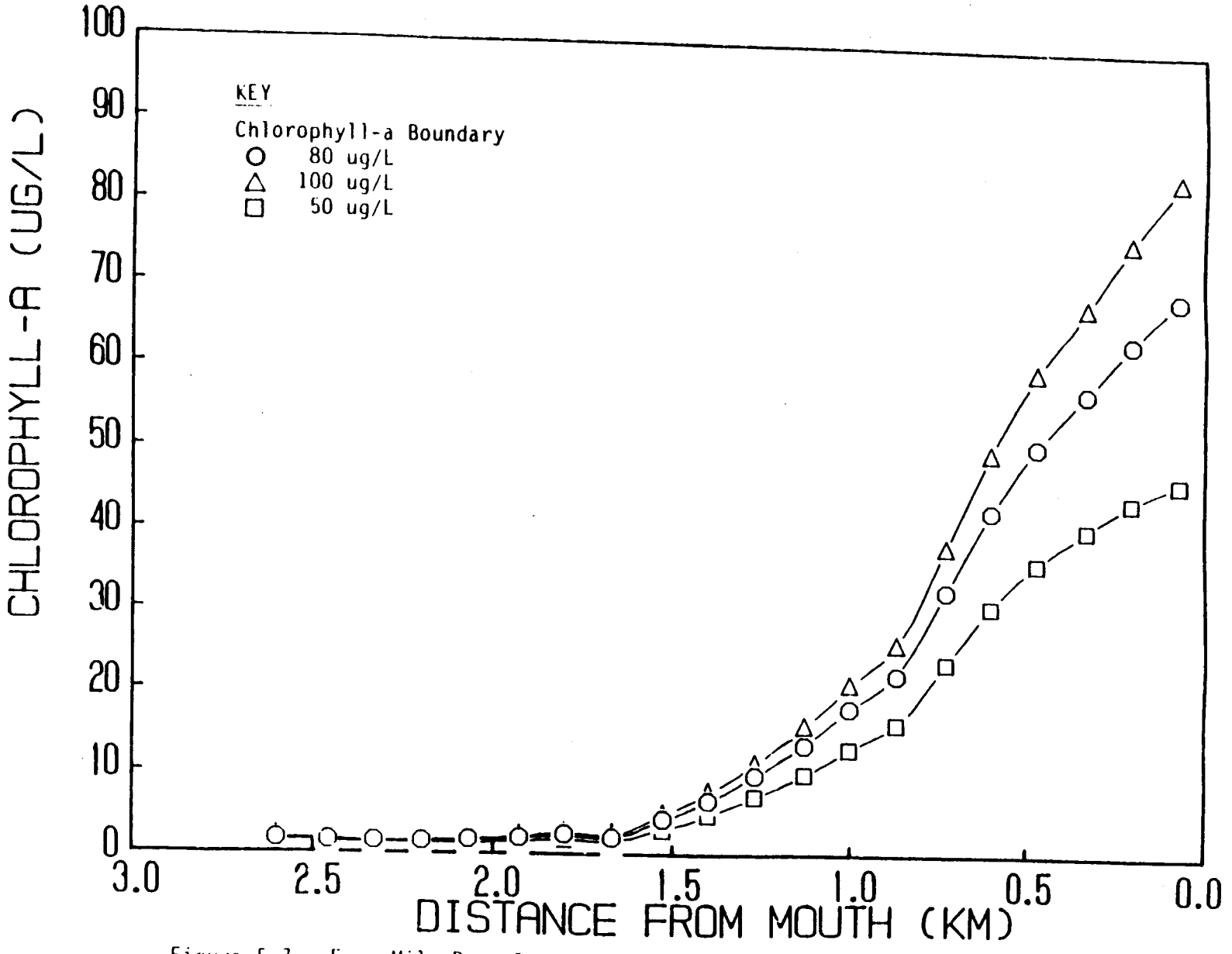


Figure 5-7. Four Mile Run, Simulated Daily Average Chlorophyll-a for Different

TABLE 5-4

FOUR MILE RUN
WATER QUALITY MODEL PROJECTIONS FOR ALTERNATIVE
BENTHIC FLUX RATES

Constituent	Flux Rate	DO (mg/l) Daily Minimum	DO (mg/l) Min. Daily Avg.	CHLA (ug/l) Zone 1 Max. Daily Avg.	CHLA (ug/l) Zone 2 Max. Daily Avg.
NH3-N	Calib. + 30%	5.0 (13)[1]	5.5 (13)	69 (26)	2 (13)
	Calib.	5.0 (13)	5.5 (13)	69 (26)	2 (13)
	Calib. - 30%	5.0 (13)	5.5 (13)	69 (26)	2 (13)
SOD	Calib. + 30%	4.7 (13)	5.3 (13)	N/A[2]	N/A
	Calib.	5.0 (13)	5.5 (13)	N/A	N/A
	Calib. - 30%	5.2 (13)	5.8 (13)	N/A	N/A

[1]Numbers in parenthesis denote location of constituent concentration by model segment.

[2]Not applicable, no effect on chla from changes in SOD.

NOTE: Wasteload scenario is Interim Control Decision with nitrification (NH3 = 1.0 mg/L, TP = 0.18 mg/L, CBOD5 = 10.0 mg/L, DO = 6.0 mg/L).

The calibrated benthic flux rate for ammonia ranges from 0.0 to 0.02 gm/m^2/day at 20°C as a source of ammonia. Plus or minus 30 percent changes to these rates had no effect on the embayment minimum dissolved oxygen values nor on the maximum daily average chlorophyll-a values for the two zones. Figures 5-8 and 5-9 present for the three different ammonia benthic flux rates the average daily dissolved oxygen profile and the average daily chlorophyll-a profile, respectively.

The calibrated SOD flux rate is approximately 1.0 gm/m^2/day at 20°C for all modeled segments. As shown in Table 5-4, the dissolved oxygen response to a plus and minus 30 percent change of the calibrated SOD rate is minimal in segment 13 just upstream of the plant discharge. The daily minimum and minimum daily average DO concentrations for an increase in SOD still met the State's dissolved oxygen standards. The dissolved oxygen concentrations vary to a larger degree in the downstream segments of the embayment as shown in Figure 5-10 which presents the plots of the average daily DO concentrations for the three SOD rate cases.

5.4 EMBAYMENT RESPONSE TO WWTP PHOSPHORUS LOADS

Three levels of WWTP total phosphorus discharge, including 0.18, 0.40 and 1.0 mg/L, are investigated to determine the dissolved oxygen and chlorophyll-a response in the embayment. For this analysis, three different chlorophyll-a concentrations at the Potomac Estuary boundary are also simulated for each set of phosphorus levels from the WWTP. The boundary chlorophyll-a concentrations include 80 ug/L (the design condition), 100 ug/L and 50 ug/L. The Interim Control Decision without nitrification is used in this analysis as the baseline wasteload scenario (NH3 = 20.0 mg/L, CBOD5 = 10.0 mg/L, DO = 6.0 mg/L). The total effluent phosphorus is proportioned with 10 percent as organic phosphorus and 90 percent as orthophosphorus.

The embayment response for dissolved oxygen and chlorophyll-a to this series of effluent phosphorus loads and Potomac Estuary boundary conditions is given in Table 5-5. The table gives the daily minimum dissolved oxygen, the minimum daily average dissolved oxygen and their locations by model segment number. The maximum daily average chlorophyll-a concentrations are

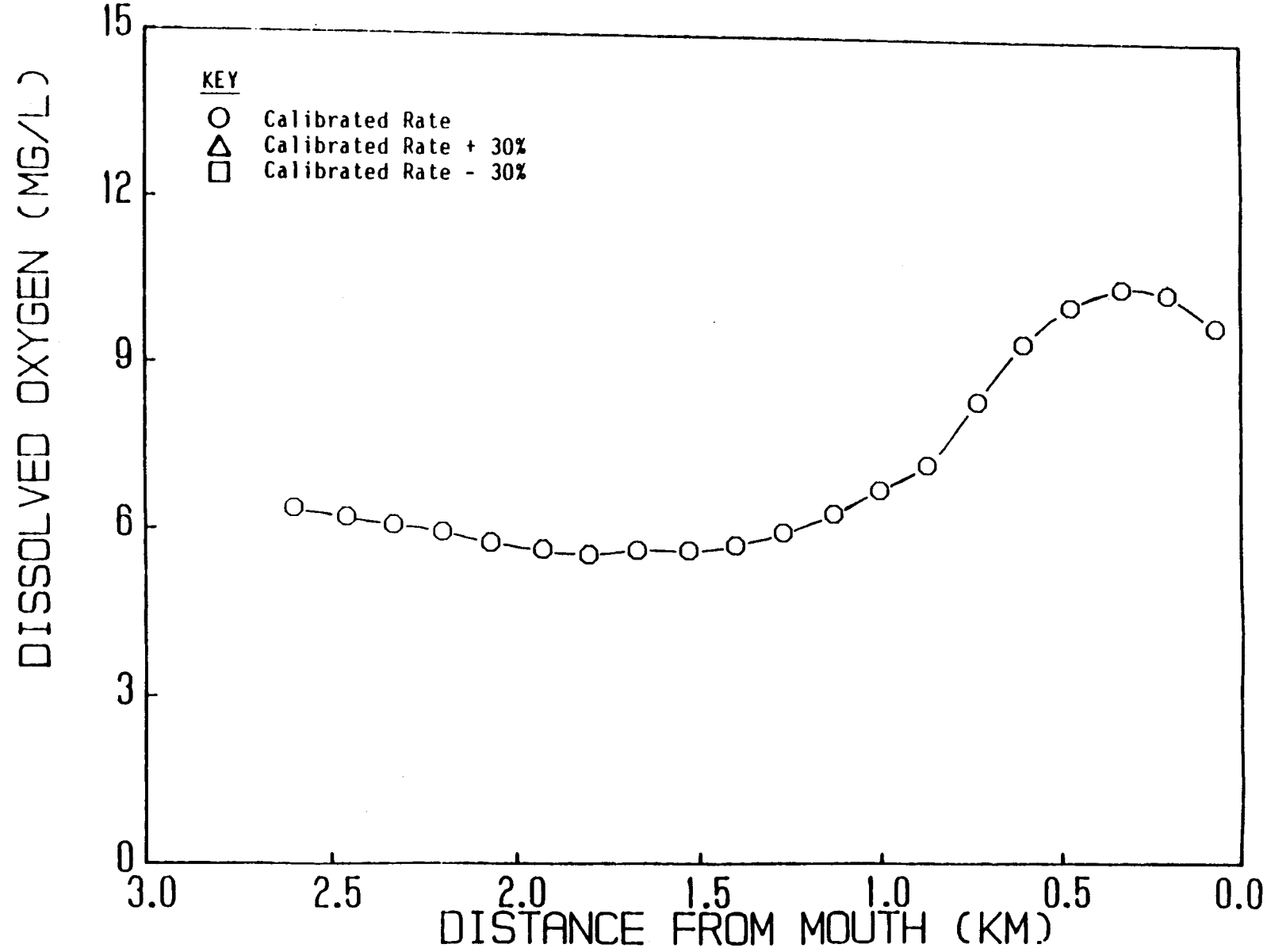


Figure 5-8. Four Mile Run, Simulated Daily Average Dissolved Oxygen for Different Ammonia-N Benthic Flux Rates; Interim Control Decision with Nitrification

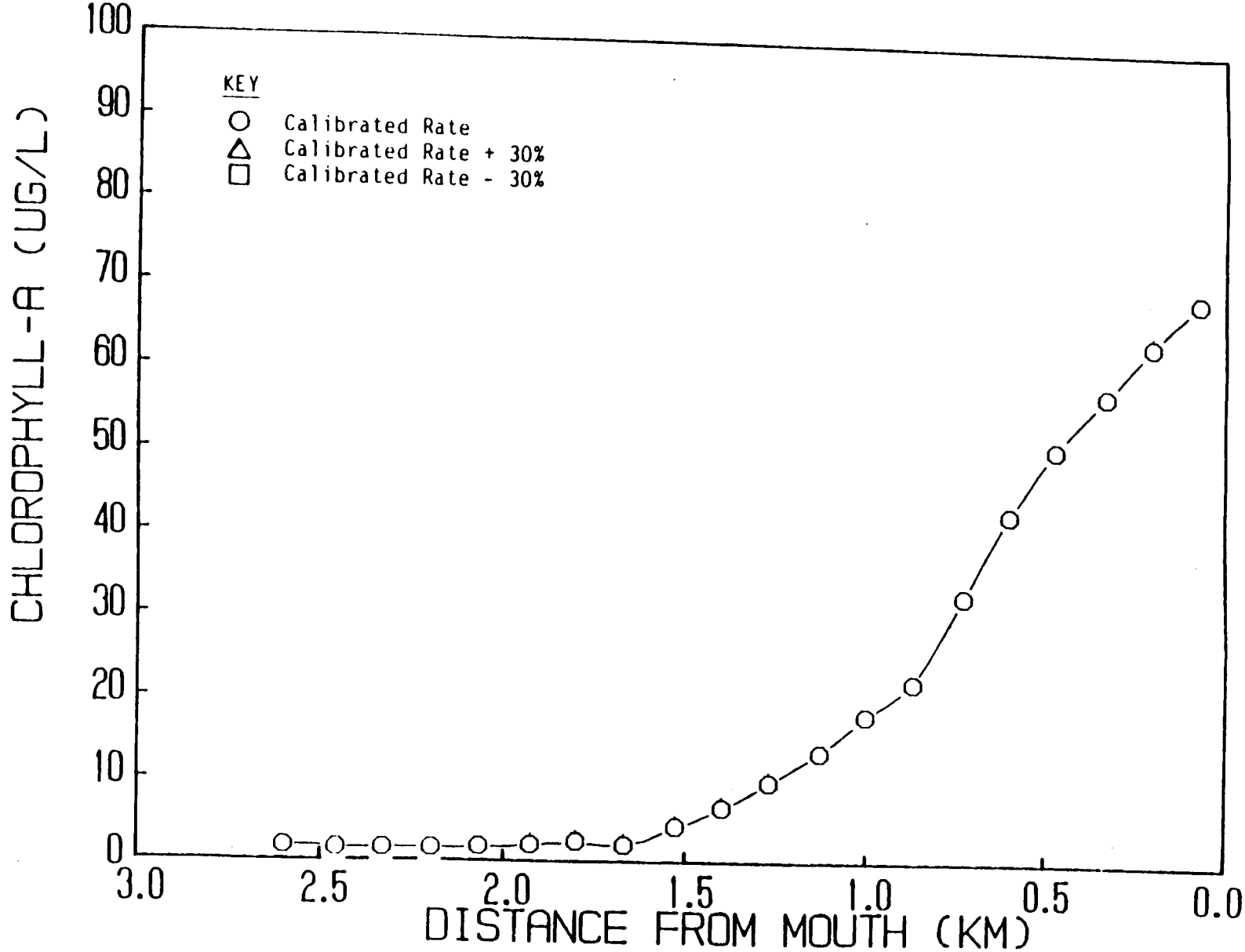


Figure 5-9. Four Mile Run, Simulated Daily Average Chlorophyll-a for Different Ammonia-N

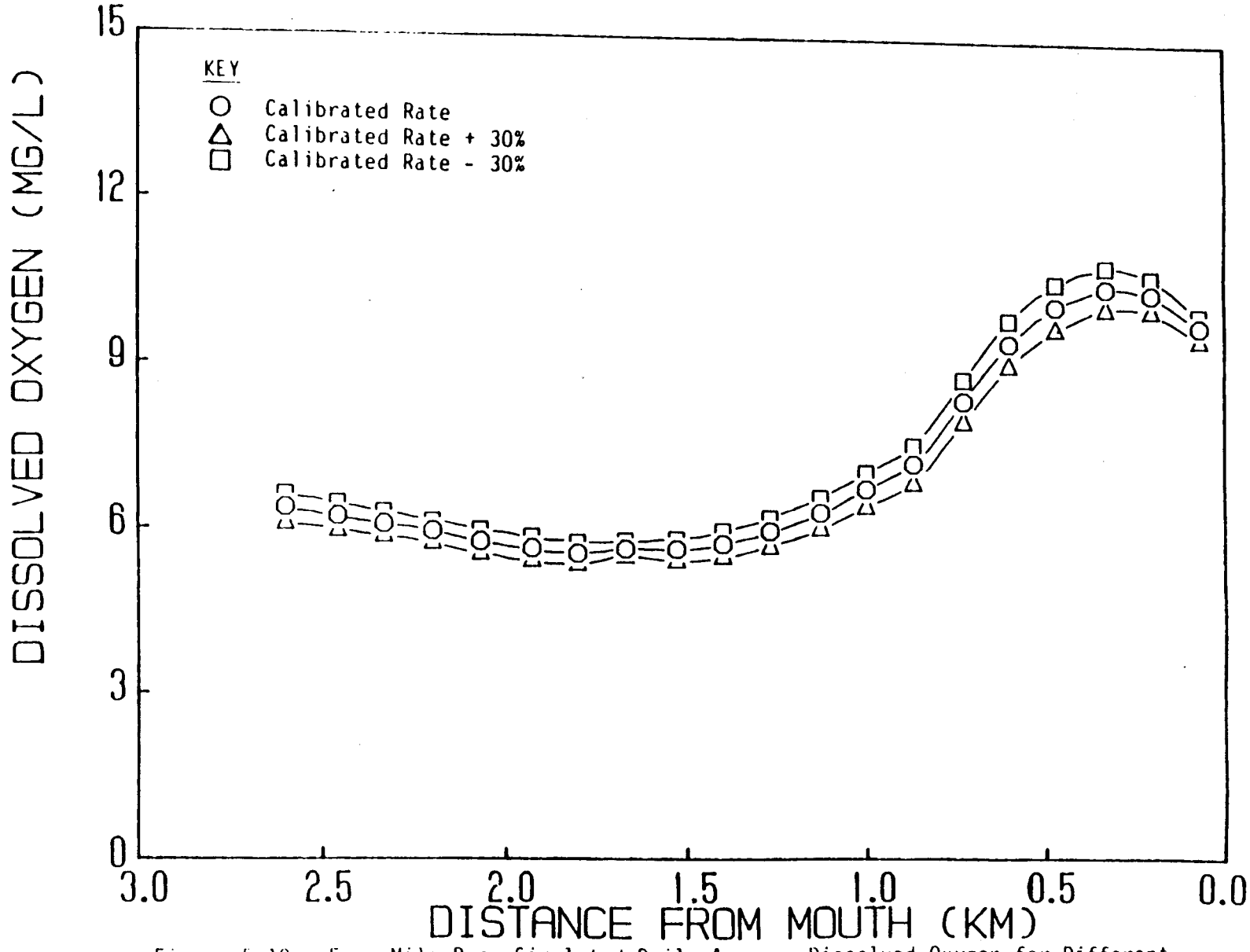


Figure 5-10. Four Mile Run, Simulated Daily Average Dissolved Oxygen for Different Sediment Oxygen Demands; Interim Control Decision with Nitrification

TABLE 5-5

FOUR MILE RUN
WATER QUALITY MODEL PROJECTIONS FOR ALTERNATIVE
WWTP TOTAL PHOSPHORUS LOADS AND CHLOROPHYLL-A BOUNDARY CONDITIONS

Boundary chla (ug/L)	TP Effluent Conc. (mg/L)	DO (mg/l)		CHLA (ug/l)	
		Daily Minimum	Min. Daily Avg.	Zone 1 Max. Daily Avg.	Zone 2 Max. Daily Avg.
80[1]	0.18	4.8 (13)[2]	5.4 (13)	69 (26)	2 (13)
	0.40	4.9 (13)	5.5 (13)	73 (26)	2 (13)
	1.00	4.9 (13)	5.5 (13)	74 (26)	2 (13)
100	0.18	4.9 (13)	5.5 (13)	83 (26)	2 (13)
	0.40	4.9 (13)	5.5 (13)	88 (26)	3 (13)
	1.00	4.9 (13)	5.5 (13)	90 (26)	3 (13)
50	0.18	4.8 (13)	5.3 (16)	47 (26)	2 (13)
	0.40	4.8 (13)	5.4 (15)	49 (26)	2 (13)
	1.00	4.8 (13)	5.4 (15)	50 (26)	2 (13)

[1]Design boundary condition.

[2]Numbers in parenthesis denote location of constituent concentration by model segn

NOTE: Wasteload scenario is Interim Control Decision without nitrification (NH3 = 20.0 mg/L, CBOD5 = 10.0 mg/L, DO = 6.0 mg/L).

also given for the two chlorophyll-a management zones for which chlorophyll-a goals have been established. The effects of the various total phosphorus effluent concentrations on the chlorophyll-a concentrations in the embayment are only minimal in the downstream zone 1 and are negligible in the upstream zone 2. In zone 1, the maximum daily average chlorophyll-a concentrations range from 69 ug/L to 74 ug/L with a boundary chlorophyll-a of 80 ug/L; from 83 ug/L to 90 ug/L with a boundary of 100 ug/L; and from 47 ug/L to 50 ug/L with a boundary of 50 ug/L. In zone 2 the maximum daily average chlorophyll-a remains at 2 ug/L in all cases except for total phosphorus concentrations of 0.40 mg/L and 1.0 mg/L with a boundary of 100 ug/L which only increases the concentration to 3 ug/L. Figures 5-11, 5-12 and 5-13 give the chlorophyll-a profiles for the three phosphorus alternatives for the boundary condition of 80 ug/L, 100 ug/L and 50 ug/L, respectively. The chlorophyll-a goal for zone 2 is not violated, and the zone 1 goal is violated only for a boundary of 100 ug/L of chlorophyll-a.

Changes to the chlorophyll-a and dissolved oxygen in the upper reaches of Four Mile Run are minimized due to the hydrodynamic response of the embayment from the WWTP discharge and the small volumes of water which characterize these upper reaches. The WWTP discharge tends to limit the propogation of algae to the upstream reaches by decreasing the velocities in the upstream direction during flood tide. Also the upstream segments of Four Mile Run have relatively small volumes which are mostly flushed out during the ebb tide prohibiting a quiescent condition in which algal growth is more likely to occur.

The minimal changes in the dissolved oxygen concentrations reflect the minimal changes in the chlorophyll-a concentrations. Table 5-5 presents the daily minimum and minimum daily average DO concentrations which occur in the vicinity of the treatment plant discharge. These values do not vary by more than 0.1 mg/L dissolved oxygen for all cases analyzed.

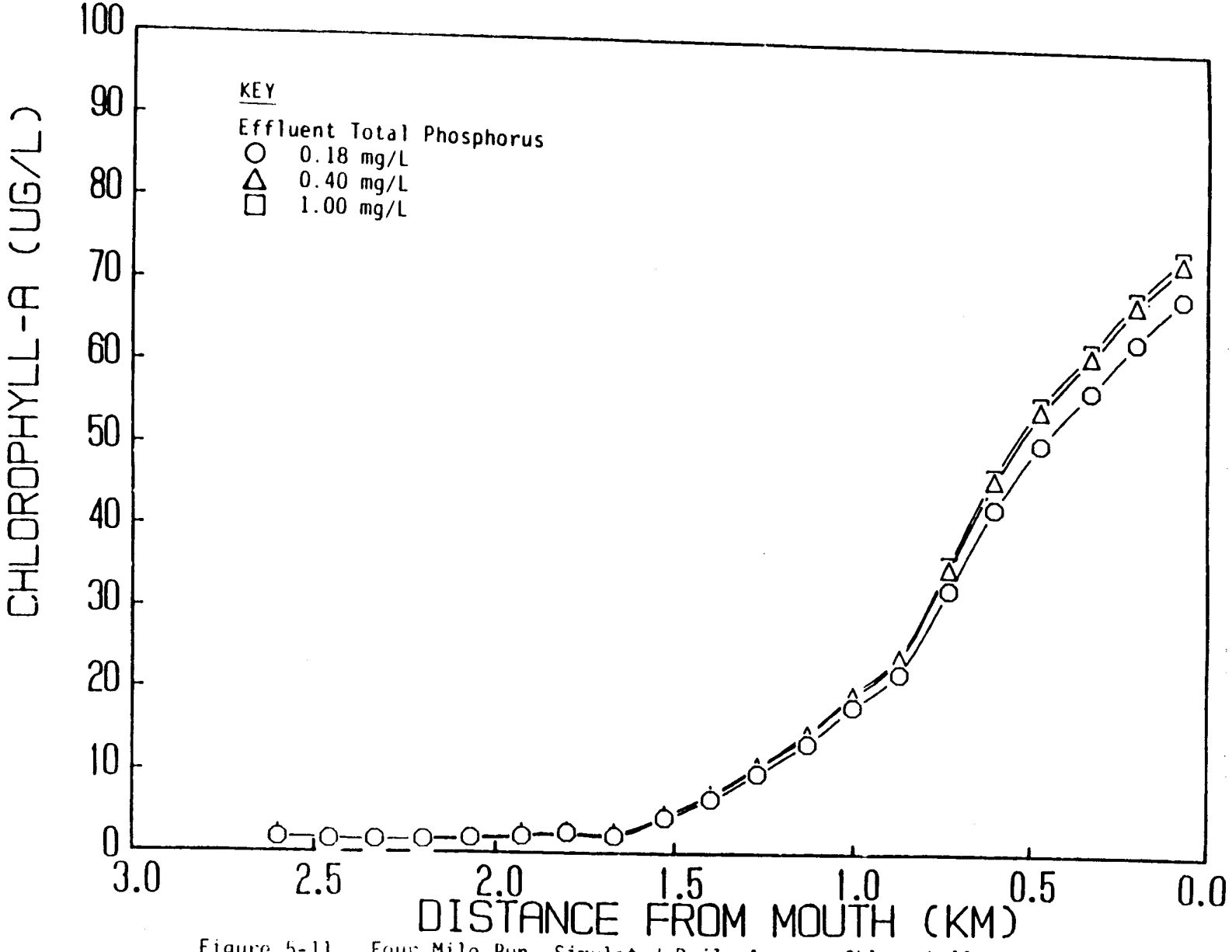


Figure 5-11. Four Mile Run, Simulated Daily Average Chlorophyll-a for Chlorophyll-a Boundary of 80 ug/L Interim Control Period without Nitrification

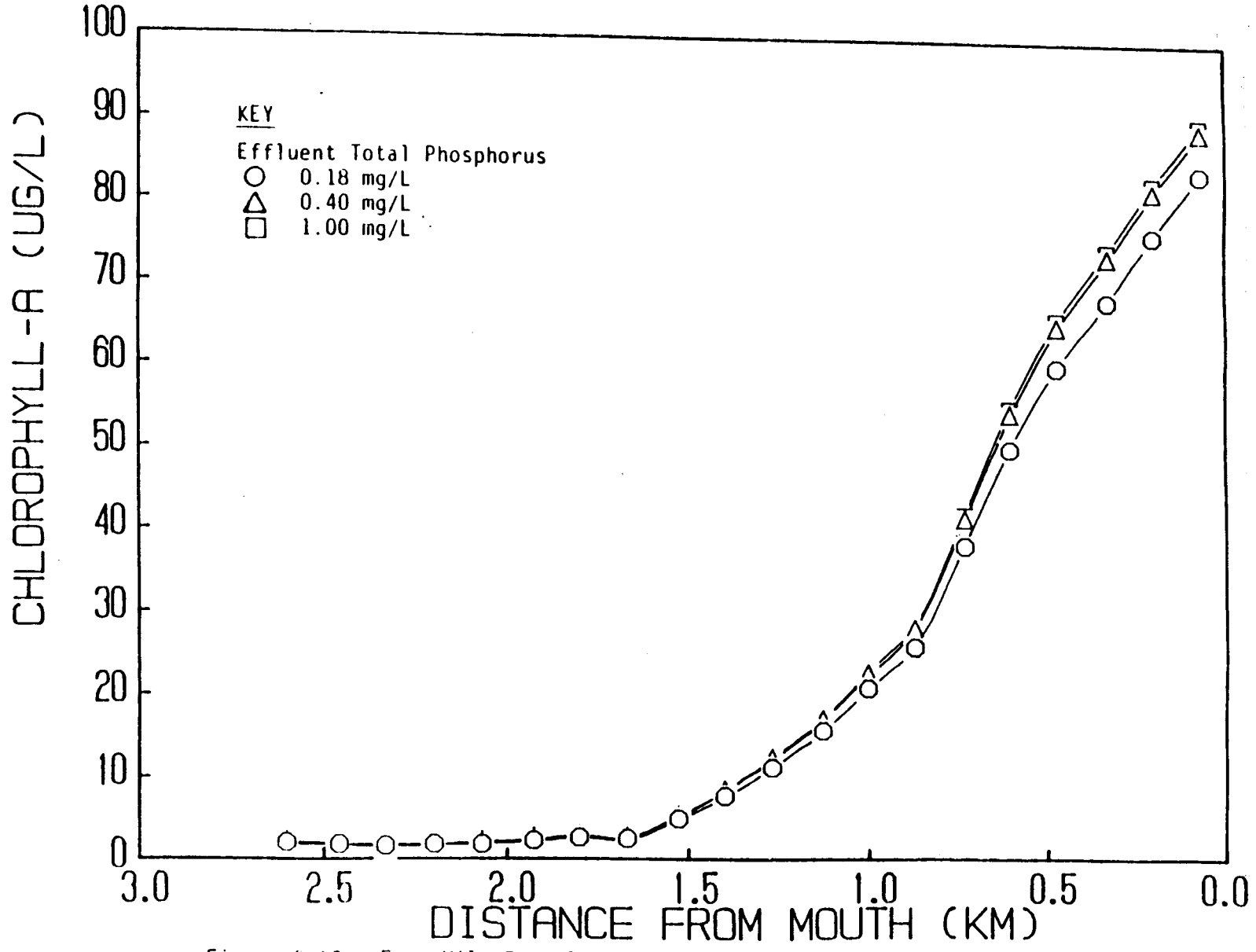


Figure 5-12. Four Mile Run, Simulated Daily Average Chlorophyll-a for Chlorophyll-a Boundary of 100 ug/L; Interim Control Decision without Nitrification

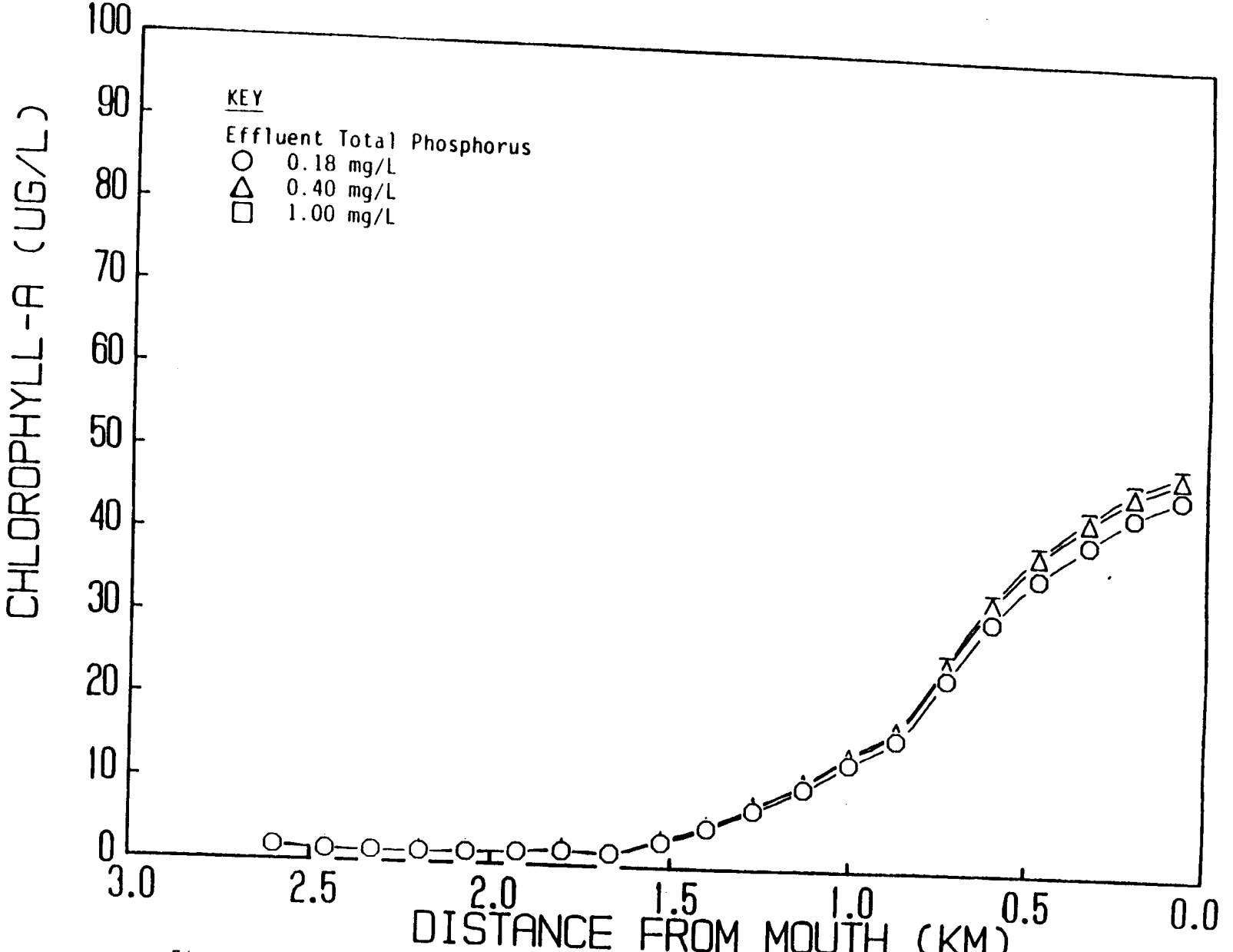


Figure 5-13. Four Mile Run, Simulated Daily Average Chlorophyll-a for Chlorophyll-a Boundary of 50 ug/L

5.5 NITROGEN REMOVAL

By considering biological nutrient removal processes, nitrogen removal is investigated as part of the sensitivity analysis to determine the effect on the chlorophyll-a response in the embayment. An effluent total nitrogen of 6.0 mg/L (0.0 mg/L organic, 2.4 mg/L ammonia and 3.6 mg/L nitrite plus nitrate) is simulated with a total phosphorus of 0.18 mg/L and 1.0 mg/L with the design boundary condition.

For Four Mile Run, these two cases are compared to the two Interim Control Decision without nitrification (TN=20.0 mg/L) cases for a TP of 0.18 mg/L and TP of 1.0 mg/L. The results for the Interim Control Decision without nitrification, under the design boundary condition, are given in Table 5-5. (For all four cases considered the CBOD5 = 10.0 mg/L and the DO = 6.0 mg/L.) For both a TP of 0.18 and 1.0 mg/L the reduction in total nitrogen, from 20.0 to 6.0 mg/L, did not change the maximum daily average chlorophyll-a for the two chlorophyll-a management zones. For a TP of 0.18 mg/L the chlorophyll-a concentrations are 69 ug/L (segment 26) for zone 1, and 2 ug/L (segment 13) for zone 2. For a TP of 1.0 mg/L the chlorophyll-a concentrations are 74 ug/L (segment 26) for zone 1, and 2 ug/L (segment 13) for zone 2.

5.6 NITROGEN:PHOSPHORUS RATIO

The ratio of total nitrogen to total phosphorus (N/P) is considered as part of the sensitivity study. The N/P ratio within the embayment should be greater than or equal to 10. This ratio is set to minimize the proliferation of nuisance blue-green algae which tend to predominate when the N/P ratio falls below 10. In Four Mile Run, the minimum N/P ratios within the embayment are determined for several wasteload scenarios. The minimum ratios and their segment locations are given in Table 5-6 for different wasteload scenarios. Without nitrogen removal, the N/P ratios are all above 10 for each of the scenarios investigated. The Consent Order (total phosphorus equal to 1.0 mg/L) and the Interim Control Decision with a total phosphorus of 1.0 mg/L produced the lowest N/P ratios with values near 20. The other scenarios which produce higher N/P ratios have smaller total phosphorus effluent concentrations. With nitrogen removal the low TP of

TABLE 5-6

FOUR MILE RUN
TOTAL NITROGEN TO TOTAL PHOSPHORUS RATIOS
FOR SELECTED WASTELOAD SCENARIOS

Scenario	Minimum N/P Ratio	Segment Location
Potomac Embayment Standards	96	7
Consent Order	22	14
Interim Control Decision with Nitrification	104	7
Interim Control Decision Without Nitrification for		
TP = 0.18 mg/L	128	14
TP = 0.40 mg/L	58	14
TP = 1.00 mg/L	23	14
Nitrogen Removal (TN = 6.0 mg/L)		
TP = 0.18 mg/L	36	14
TP = 1.00 mg/L	6.5	14

0.18 mg/L gives a ratio of 36. However for a TP = 1.0 mg/L with nitrogen removal the ratio falls below 10 with a value of 6.5.

5.7 TREATMENT PLANT DISCHARGE LOCATIONS

In addition to the analysis of the existing treatment plant location, two alternative discharge locations are investigated to determine the response in the embayment and the pollutant flux to the Potomac main stem. The present discharge location is at segment number 14 as shown in Figure 5-1. The alternative locations include one upstream at segment 10 and one downstream at segment 16. The downstream location was restricted to Virginia waters and no analyses were performed on a discharge to D.C. waters which include model segments 19 to 26. The baseline wasteload scenario for this analysis is the Interim Control Decision without nitrification (NH3 = 20.0 mg/L, TP = 0.18 mg/L, CBOD5 = 10.0 mg/L, DO = 6.0 mg/L). The design chlorophyll-a concentration of 80 ug/L is also used in the analysis.

For the different treatment plant locations no adjustments are made to the ammonia and SOD benthic flux rates. The embayment response to variations in the ammonia flux rate are negligible and the SOD benthic rate is the same for all modeled segments.

5.7.1 FOUR MILE RUN

Table 5-7 presents the dissolved oxygen and chlorophyll-a embayment response to the three treatment plant discharge locations. In comparison to the present location the upstream location at segment 10 (see Figure 5-1) does not affect the daily minimum and the minimum daily average dissolved oxygen concentrations. The maximum daily average chlorophyll-a concentrations in zone 1 and zone 2 remain the same. However, the downstream location has a slight effect on the dissolved oxygen by increasing the concentrations of the daily minimum and the minimum daily average. Chlorophyll-a concentrations are not increased in the downstream segments for the downstream WWTP location. However, the chlorophyll-a is allowed to propagate further upstream and shows a slight increase in concentration in zone 2 with a maximum daily average of 8 ug/L in segment 14. Figures 5-14 and 5-15 present

TABLE 5-7

FOUR MILE RUN
WATER QUALITY MODEL PROJECTIONS FOR ALTERNATIVE
TREATMENT PLANT DISCHARGE LOCATIONS

Discharge Location (Model Segment)	DO (mg/l)		CHLA (ug/l)	
	Daily Minimum	Min. Daily Avg.	Zone 1 Max. Daily Avg.	Zone 2 Max. Daily Avg.
14 (present)	4.8 (13)[1]	5.4 (13)	69 (26)	2 (13)
10 (upstream)	4.9 (20)	5.4 (15)	69 (26)	2 (14)
16 (downstream)	5.2 (20)	5.9 (16)	69 (26)	8 (14)

[1]Numbers in parentheses denote location of constituent concentration by model segment.

NOTE: Wasteload scenario is Interim Control Decision without nitrification (NH3 = 20.0 mg/L, TP = 0.18 mg/L, CBOD5 = 10.0 mg/L, DO = 6.0 mg/L).

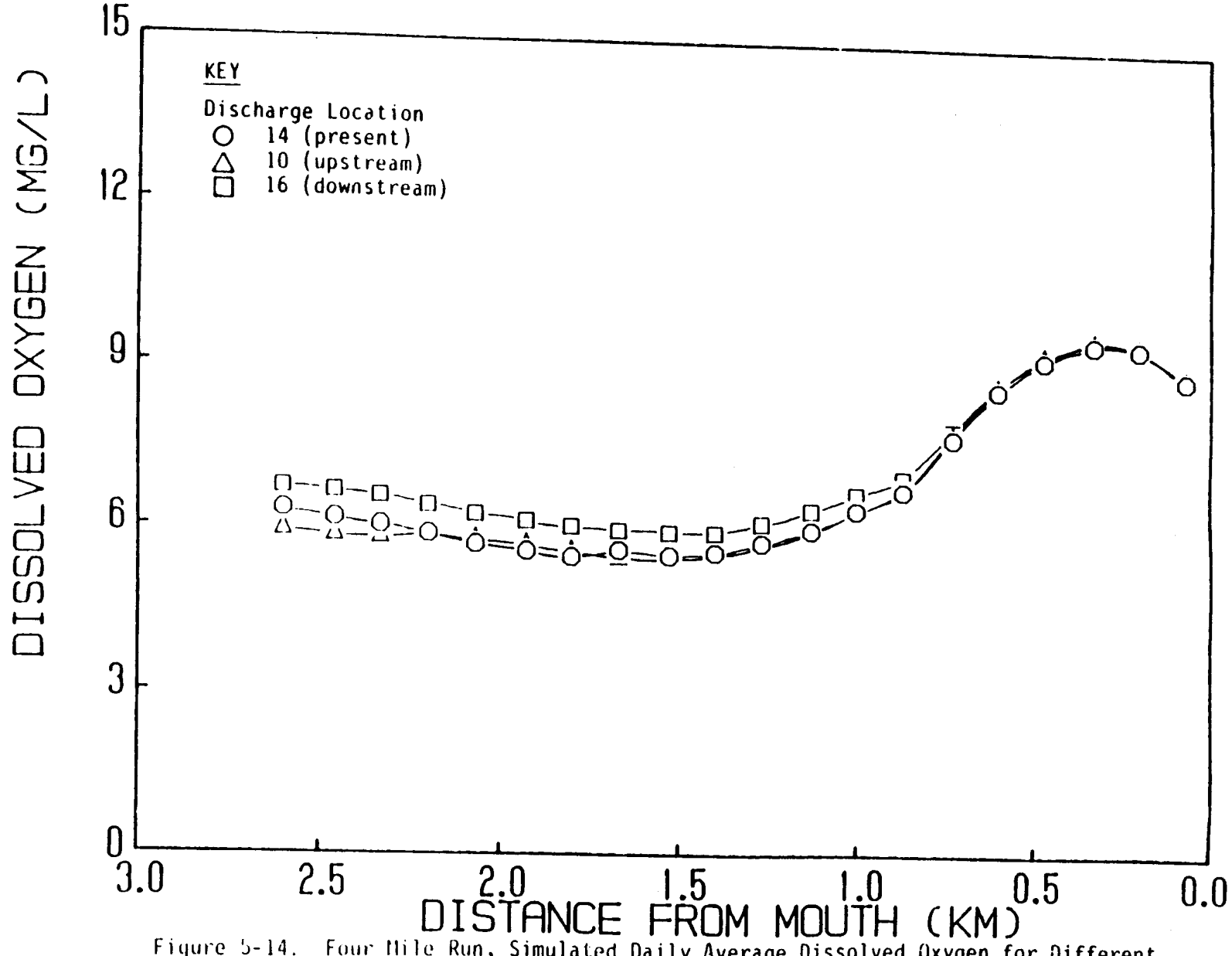
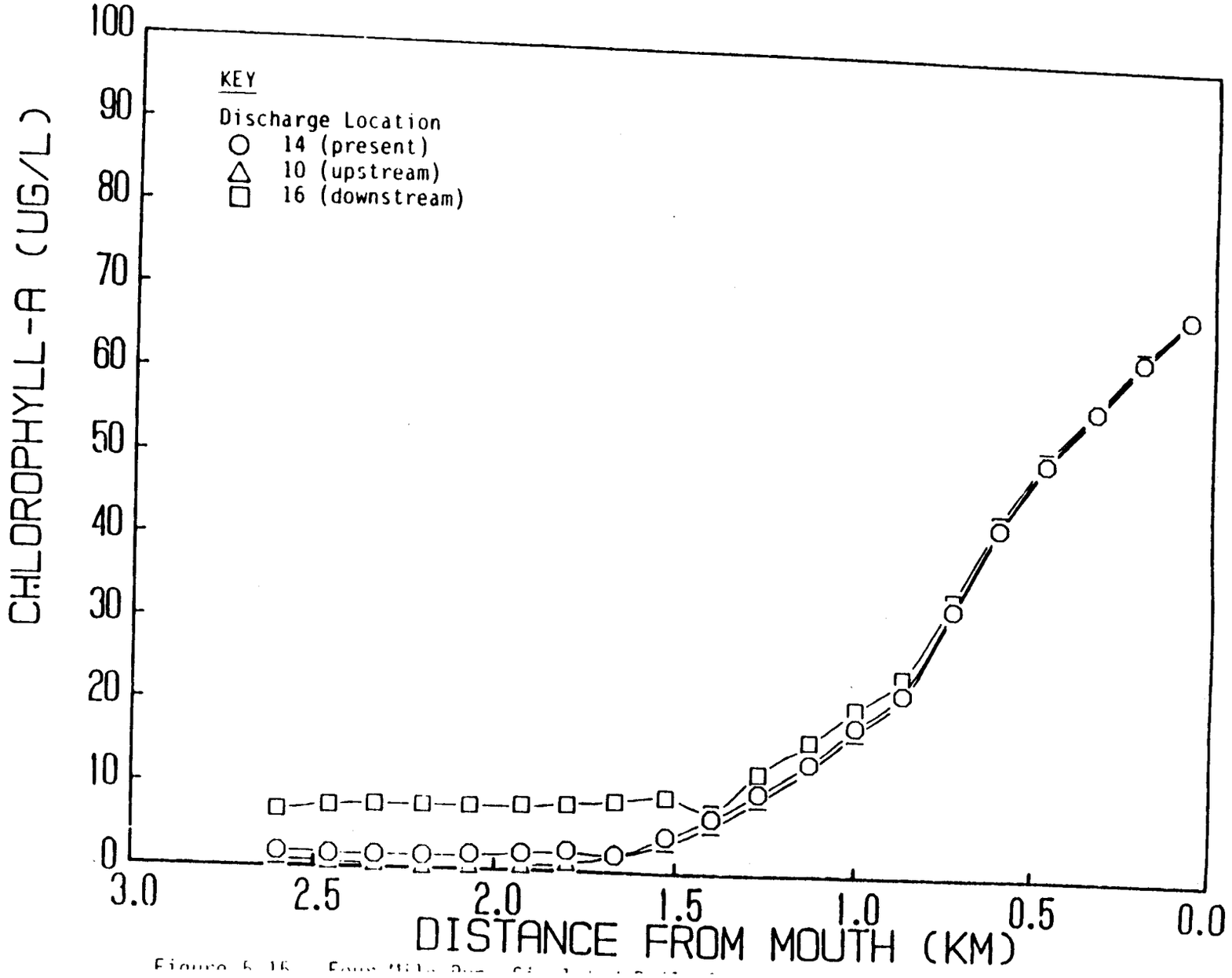


Figure 5-14. Four Mile Run, Simulated Daily Average Dissolved Oxygen for Different WWTP Locations; Interim Control Decision without Nitrification


KEY
Discharge Location
14 (present)
10 (upstream)
16 (downstream)
CHLOROPHYLL-A (UG/L)
100
90
80
70
60
50
40
30
20
10
0
3.0
2.5
2.0
1.5
1.0
0.5
0.0
DISTANCE FROM MOUTH (KM)

for the three different WWTP locations the daily average dissolved oxygen and chlorophyll-a profiles, respectively.

5.7.2 POTOMAC MAIN STEM

The pollutant exports to the Potomac main stem for the present, upstream and downstream locations of the Arlington WWTP are analyzed by considering the net flux of ammonia, CBODU and total phosphorus due to the WWTP. The Interim Control Decision without nitrification (NH3 = 20.0 mg/L) is analyzed for all locations, and an additional analysis is performed for the wasteload scenario with nitrification (NH3 = 1.0 mg/L) at the present location only. The results of the pollutant flux analysis are presented in Table 5-8.

The WWTP's net ammonia flux from the embayment to the Potomac does not vary for the three discharge locations for an ammonia effluent concentration of 20.0 mg/L. In each case, just over 90 percent of the WWTP load is exported to the Potomac main stem. The ammonia decay rate and the ammonia interactions with organic nitrogen and chlorophyll-a act together to produce the similar results for the discharge locations. For the present location only, the flux is computed for an ammonia concentration of 1.0 mg/L to represent nitrification. Only 23 percent of this lower WWTP load is exported to the Potomac as a larger percentage of the ammonia is removed by algal uptake.

The CBODU flux analysis shows an increase in flux to the Potomac for WWTP locations closer to the mouth. The upstream and downstream differences compared to the present location only show a 3-4 percent difference in the net flux due to the WWTP. The changes in BOD flux occur because the CBODU load does not have as long a time to decay for the discharges which are closer to the mouth. The total phosphorus flux also shows a slight increase in the net flux due to the WWTP for locations which are closer to the Potomac boundary. The percentages are small, however, with only a one percent difference from present to upstream location and from present to downstream location.

TABLE 5-8

FOUR MILE RUN
WATER QUALITY MODEL POTOMAC MAIN STEM FLUX PROJECTIONS
FOR ALTERNATE TREATMENT PLANT DISCHARGE LOCATIONS

Constituent	WWTP Load (mg/L)	WWTP Load (kg/day)	Discharge Location (segment)	Net Flux due to WWTP (kg/day)	Percent of WWTP Load to Potomac
Ammonia-N (without Nitrification)	20.0	2,280	14 (present)	2,080	91
			10 (upstream)	2,080	91
			16 (downstream)	2,080	91
Ammonia-N (with Nitrification)	1.0	114	14 (present)	27	23
CBODU (CBOD5=10.0 mg/L)	27.0	3,070	14 (present)	466	15
			10 (upstream)	343	11
			16 (downstream)	545	18
Total Phosphorus	0.18	21	14 (present)	3.9	19
			10 (upstream)	3.7	18
			16 (downstream)	4.1	20

Overall, for the Four Mile Run embayment, the percentages of the WWTP loads which are exported to the Potomac main stem do not change significantly for the different locations selected for this analysis. However, for the present location and a WWTP ammonia concentration of 20.0 mg/L, a large percentage of the ammonia (91 percent) is exported to the Potomac and only 15 percent of the CBODU and 19 percent of the total phosphorus are exported to the Potomac.

6.0 FINAL WLA ALTERNATIVE ANALYSIS FOR FOUR MILE RUN

6.1 EMBAYMENT DESIGN CONDITIONS

In addition to the established low flow and high temperature design conditions, three other conditions are set for the final analysis of the wasteload allocation alternatives. They include: Potomac Estuary boundary conditions, sediment oxygen demand and discharge location.

6.1.1 POTOMAC ESTUARY BOUNDARY CONDITIONS

For the sensitivity analysis, the Potomac Estuary boundary conditions of Four Mile Run were based on PEM model runs as described in Section 3.4 and Section 4.1.2. The analysis of changes to the chlorophyll-a and DO at the Potomac Estuary boundary for the Interim Control Decision with and without nitrification showed that changes in the boundary condition did not significantly affect the minimum dissolved oxygen values, nor violate the chlorophyll-a goals for each of the two management zones.

In a recent study by the Metropolitan Washington Council of Governments (1987), an evaluation of the dissolved oxygen in the main stem Potomac was conducted. Although most of the DO study modeling was conducted using the Dynamic Estuary Model (DEM), new PEM model runs were also carried out to estimate the DO impact of wasteload scenarios which included with and without nitrification for the Arlington and Alexandria wastewater treatment plants. The Council of Governments (COG) made two major changes to the PEM model for their DO study. They include: a reduction in the algal growth rate which produced a lower and more reasonable chlorophyll-a concentration in the Upper Potomac, and a reduction in the nitrification rate which produced a more reasonable ammonia decay rate resulting in somewhat higher ammonia concentrations.

The main stem water quality conditions that were predicted by the new PEM runs were compared to the boundary conditions used during the sensitivity analysis. For the sensitivity studies, the Potomac Estuary boundary

conditions for Four Mile Run were set for different nitrification wasteload scenarios (i.e., PEM run A2 was used to reflect nitrification at the Arlington plant and PEM run D7 was used to reflect no nitrification at the Arlington plant). The Four Mile Run boundary conditions for the new PEM model runs which reflect with and without nitrification are compared in Table 6-1 to the corresponding boundary conditions of the sensitivity runs. There are no major differences for nutrients, DO and CBODU. The chlorophyll-a concentration of 60 ug/L for the DO study is 20 ug/L less than the 80 ug/L used in the sensitivity study. In order to evaluate the impact of the new PEM boundary conditions on the embayment dissolved oxygen concentrations, the Interim Control Decision with and without nitrification scenarios are simulated.

For each case, the minimum daily average DO concentration for the new PEM boundary conditions is only 0.05 mg/L less than the minimum daily average DO concentration produced with the original Potomac Estuary boundary conditions. Thus, the change in boundary conditions (as shown in the previous sensitivity study) does not have a significant impact on the upstream minimum daily average DO. Therefore the original design conditions used during the sensitivity studies are used in the final analysis.

6.1.2 SEDIMENT OXYGEN DEMAND

The sediment oxygen demand (SOD) used in the sensitivity studies was the benthic rate calibrated and verified for the Four Mile Run model. Corrected to 20 C, a rate of approximately 1.0 $gm/m^2/day$ was applied to all model segments. As part of the COG DO study, a total of three in-situ measures were taken in Four Mile Run and two laboratory measures were performed on cores in 1986. Based on an analysis of in-situ and laboratory techniques, the COG study concluded that the in-situ measures are preferred over the laboratory measures. With the temperature correction to 20 C, for comparative purposes, the 1986 average SOD rate was 4.6 $gm/m^2/day$. This value, based on three measures, is 4.6 times as great as the calibrated and verified SOD.

TABLE 6-1

FOUR MILE RUN
POTOMAC ESTUARY BOUNDARY CONDITION COMPARISON

Cases	Main Stem Concentrations							
	Org.N (mg/L)	NH3 (mg/L)	NO3 (mg/L)	Org.P (mg/L)	Ortho-P (mg/L)	Chla (ug/L)	CBODU (mg/L)	DO (mg/L)
STP Without Nitrification								
Sensitivity Study[1]	0.68	0.27	1.8	0.023	0.006	80	1.0	7.3
New DO Study[2]	0.60	0.42	1.7	0.023	0.009	60	1.0	7.3
STP With Nitrification								
Sensitivity Study	0.67	0.03	1.9	0.023	0.006	80	1.0	8.0
New DO Study	0.62	0.05	2.4	0.023	0.009	60	1.0	7.7

[1]Boundary conditions used for sensitivity studies which were developed from runs made for Blue Plains Feasibility Study (Greeley and Hansen, 1984).

[2]Boundary conditions produced by new PEM runs performed by Metropolitan Washington Council of Governments (1987).

The model SOD value was based on measures taken during July 1981 and also on small adjustments during the calibration process. The SOD value of 1.0 gm/m^2/day used in the Four Mile Run model is approximately equal to the mean SOD value of 1.1 gm/m^2/day measured in the main stem Potomac during the COG DO study survey of 1986 Both value are temperature corrected to 20^oC for comparative purposes.

The new 1986 Four Mile Run SOD values imply that there is a much greater oxygen demand from the sediment than there was in 1981. From recent surveys, on the main stem, indications are that the SOD has declined over the past several years. Although a very small sample of three SOD measures during 1986 showed higher SOD values than in the past, based on the trend of declining SOD values, the previously calibrated and verified SOD values are used in the detailed analysis.

6.1.3 TREATMENT PLANT LOCATION

Changes in the location of the wastewater treatment plant did not have significant impacts on the minimum dissolved oxygen values nor on the maximum daily chlorophyll-a concentrations in the embayment. The upstream and present locations produced similar results and the downstream location only increased the minimum daily average dissolved oxygen concentration by 0.5 mg/L. Therefore, the present discharge location is used in the final analysis of WLA alternatives.

6.2 WLA ALTERNATIVES

The wasteload allocation alternatives include the following:

1. Interim Control Decision with nitrification (TP=0.18 mg/L),
2. Interim Control Decision without nitrification (TP=0.18 mg/L), and
3. Interim Control Decision without nitrification (TP=1.0 mg/L).

Table 6-2 presents the effluent concentrations for the three WLA alternatives.

TABLE 6-2

EFFLUENT CONCENTRATIONS FOR WLA ALTERNATIVES

WLA Alternatives	Q (mgd)	Effluent Concentration (mg/L) Org. N	NH3	NO2+ NO3	Org. P	Ortho-P	CBOD5	DO
ARLINGTON[1] (Four Mile Run)								
1. Interim Control Decision With Nitrification (TP = 0.18 mg/L)	40.0	0.0	1.0	19.0	0.02	0.16	10.0	6.0
2. Interim Control Decision Without Nitrification (TP = 0.18 mg/L)	40.0	0.0	20.0	0.0	0.02	0.16	10.0	6.0
3. Interim Control Decision Without Nitrification (TP = 1.0 mg/L)	40.0	0.0	20.0	0.0	0.10	0.90	10.0	6.0

[1]With design Potomac Estuary boundary conditions, calibrated benthic flux rates, and at existing discharge location.

The final WLA alternative analysis is performed with a discharge of 40 mgd for the Arlington County pollution control plant. The discharge is increased from the 30 mgd used during the sensitivity studies. Based on their planning report, Arlington County has proceeded to plan for a 40 mgd facility. The water quality impacts of the expanded flows from Arlington were evaluated (NVPDC, 1987) and the study showed that an increase in flow from 30 mgd to 40 mgd did not decrease the daily minimum DO or the minimum daily average DO by more than 0.1 mg/L for a range of wasteload scenarios. Following these studies, Arlington requested to have the Four Mile Run embayment study completed assuming a 40 mgd discharge. The State Water Control Board directed NVPDC to perform the final WLA analysis using the 40 mgd value.

The dissolved oxygen and chlorophyll-a responses in the embayment to the three WLA alternatives are presented in Table 6-3. The state's dissolved oxygen standards, a daily minimum of 4.0 mg/L and minimum daily average of 5.0 mg/L, are not violated for each of the three alternatives. The WLA alternatives also remain below the chlorophyll-a goals established for Zone 1 (80 ug/L) and Zone 2 (15 ug/L).

For this analysis the "without nitrification" scenario assumes that a TKN of 20 mg/L is all in the form of ammonia as shown in Table 6-2. In the COG DO study of the Potomac main stem, the ammonia concentration for this scenario was set at 15 mg/L. This reduction does not have an impact on the dissolved oxygen concentrations in the embayment. As seen in Table 6-3, alternative number 1 with nitrification (NH3=1.0 mg/L) only provides an increase of 0.1 mg/L for the daily minimum and the minimum daily average dissolved oxygen. The relatively small impact of ammonia on the DO concentrations is a result of the large quantity (93 percent) of WWTP ammonia which is exported to the main stem of the Potomac.

At the request of the State Water Control Board, the concentration of ammonia in the main stem Potomac has also been studied with respect to the District of Columbia's un-ionized ammonia standard. The D.C. standard is 0.02 mg/L for un-ionized ammonia as N, and is applicable in the Potomac main stem between Chain Bridge and Jones Point. The concentration of

TABLE 6-3

FOUR MILE RUN
WATER QUALITY MODEL PROJECTIONS FOR WLA ALTERNATIVES

WLA Alternative	DO (mg/l) Daily Minimum	DO (mg/l) Min. Daily Avg.	CHLA (ug/l) Zone 1 Max. Daily Avg.	CHLA (ug/l) Zone 2 Max. Daily Avg.
1. Interim Control Decision With Nitrification (TP = 0.18 mg/L)	4.8 (13)	5.4 (16)	69 (26)	1 (7)
2. Interim Control Decision Without Nitrification (TP = 0.18 mg/L)	4.7 (13)	5.3 (16)	69 (26)	1 (7)
3. Interim Control Decision Without Nitrification (TP = 1.0 mg/L)	4.7 (13)	5.3 (16)	71 (29)	1 (7)

[1]Numbers in parenthesis denote location of constituent concentration by model segment.

un-ionized ammonia is a function of the ammonia concentration, temperature, and pH of the water column.

In order to evaluate the un-ionized concentration at the mouth of Four Mile Run, the Potomac main stem concentrations from the COG DO study are considered. As shown in Table 6-1, without nitrification at Arlington and Alexandria, the total ammonia simulated by the PEM model at the Four Mile Run confluence was 0.42 mg/L as N. The model does not calculate the un-ionized ammonia or the pH of the system. Therefore, to determine the un-ionized ammonia concentration the design temperature for the Potomac ($28^{o}C$, from the Blue Plains Feasibility Study) and historical pH values are considered. An analysis of pH values from 1982 to 1986 was conducted for Potomac main stem stations PMS-29, PMS-31, PMS-33, PMS-35 and PMS-37, which are located at the Four Mile Run confluence and just upstream and downstream of the confluence. The median pH for all stations during the months of June through September was 7.5.

At a pH of 7.5 and at a temperature of $28^{o}C$ the un-ionized ammonia for a total of 0.42 mg/L ammonia is 0.009 mg/L. This value does not exceed the 0.02 mg/L un-ionized ammonia standard.

6.3 POLLUTANT FLUX TO THE POTOMAC MAIN STEM

The net fluxes of ammonia, CBODU and total phosphorus are presented in Table 6-4. The table gives the WWTP load, the net flux due to the WWTP and the percent of the WWTP load exported to the Potomac for each constituent. Without nitrification 93 percent of the WWTP ammonia is exported; however, for a much smaller load of ammonia produced with nitrification the amount of ammonia exported to the main stem is 29 percent. Only 18 percent the CBODU is exported to the Potomac. The percentage of total phosphorous exported to the main stem varies from 56 percent for TP=1.0 mg/L to 27 percent for TP=0.18 mg/L.

TABLE 6-4

FOUR MILE RUN
POTOMAC MAIN STEM FLUX PROJECTIONS FOR WLA ALTERNATIVES

Constituent	WWTP Load (mg/L)	WWTP Load (kg/day)	Net Flux Due to WWTP (kg/day)	Percent of WWTP Load to Potomac
Ammonia-N (Without Nitrification)	20.0	3,030	2,810	93
Ammonia-N (With Nitrification)	1.0	152	43	29
CBODU (CBOD5 = 10.0 mg/L)	27.0	4,090	728	18
Total Phosphorus (0.18 mg/L)	0.18	27	7.5	27
Total Phosphorus (1.0 mg/L)	1.0	151	84	56

6.4 SEASONAL NITRIFICATION

Under the summer design conditions, nitrification was not required for the Arlington water pollution control plant to meet the State's dissolved oxygen standards for Four Mile Run. Therefore, an evaluation of seasonal nitrification is not required.

6.5 SEASONAL PHOSPHORUS REMOVAL

The potential for phosphorus accumulation within the embayments during months when stringent treatment standards are not imposed is evaluated for the Arlington water pollution control plant. A specific methodology has been developed to consider winter accumulation and summer release of phosphorus from the benthos for the point source contribution only. The overall approach assumes that the WWTP phosphorus which settles out during the winter months is released back into the water column during the summer months at the same rate. Studies have shown that phosphorus can accumulate for several years and then can be released at a high rate during special conditions. To predict long term settling and periodic release is beyond the scope of this study. Therefore the daily accumulation of phosphorus is translated to a release rate which is applied to the low flow, high temperature, design conditions. The analysis is conducted using the calibrated model and does not consider extreme events such as anoxic conditions or very low pH which may release more phosphorus than under normal equilibrium conditions. The calibrated Four Mile Run model has an organic P settling rate and an Ortho-P settling rate. The model does not have a calibrated benthic Ortho-P release rate or an organic P release rate.

The design condition for this analysis includes an average annual inflow rate for the headwater and incremental flows during the winter time simulation. For this simulation the dissolved oxygen of the upstream and Potomac Estuary boundaries is set at 9.2 mg/L, one mg/L less than saturation at the design temperature of $15^{o}C$. The winter time analysis does not include the simulation of algae.

In order to determine the effect of relaxing a more stringent total phosphorus allocation to a less stringent concentration in the winter months, two wasteload scenarios are selected for the analysis which includes a TP = 0.18 mg/L and a TP = 1.0 mg/L for the Interim Control Decision without nitrification. The following approach is conducted. First, the TP = 0.18 mg/L is considered a base line case. The effluent organic phosphorus and orthophosphorus load for the TP = 0.18 mg/L case is subtracted from the corresponding loads for the TP = 1.0 mg/L case to demonstrate the differential load between the two effluent cases. The total fluxes of the organic P and ortho-P to the Potomac Estuary are calculated for the two cases and the differences are computed to produce the differential load exported to the Potomac Estuary. Now, the difference of these differential loads (treatment plant effluent and flux) is the amount of phosphorus accumulated in the embayment from settling due to the treatment plant discharge of 1.0 mg/L where 0.18 mg/L is considered the base case.

For the Arlington WWTP, the incremental organic P and ortho P are 12 kg/d and 112 kg/d, respectively. The incremental organic P and ortho-P fluxes to the Potomac are 3 kg/d and 81 kg/d, respectively. Therefore the incremental phosphorus accumulation is 9 kg/d for organic P and a 31 kg/d for ortho-P.

The accumulation rate is then applied to the model during the summer time design conditions. The benthic phosphorus release rates are distributed evenly to reaches 7 through 26. Two cases are considered. For the first, the accumulated organic P and ortho-P are both released separately as $g/m^2/day$ in the model. The organic P release rate is 0.02 $g/m^2/day$, and the ortho-P release rate is 0.06 $g/m^2/day$. The maximum average daily chlorophyll-a occurs in segment 26 with a value of 71 ug/L for zone 1, and in segment 7 with a value of 1 ug/L for zone 2. For the second and more conservative case, the accumulated organic P and ortho-P are released as all ortho-P during the summer time simulation. The release rate is 0.08 $g/m^2/day$. The maximum average daily chlorophyll-a concentrations are the same as those simulated in the first case, and do not exceed the chlorophyll-a management goals.

6.6 COST

Cost information for the Arlington WWTP was provided by the Arlington County Department of Public Works. Arlington is presently treating within the effluent limits set in scenario number 2, Interim Control Decision without nitrification with TP=0.18 mg/L. Seasonal phosphorus removal (i.e., April-October: TP = 0.18 mg/L and November-March: TP = 1.0 mg/L) would provide an annual O&M cost savings of $100,000. There would be no capital cost saving since Arlington is presently removing phosphorus to a 0.18 mg/L level. For a year-round total phosphorus effluent concentration of 1.0 mg/L (WLA alternative number 3) the annual O&M cost saving would be $300,000.

6.7 RECOMMENDED WASTELOAD ALLOCATION

The State's dissolved oxygen standards are not predicted to be violated for the Interim Control Decision with a CBOD5 of 10.0 mg/L and without nitrification. A total phosphorus concentration of 1.0 mg/L in the WWTP effluent is not predicted to violate the chlorophyll-a goal of 80 ug/L for zone 1 and 15 ug/L for zone 2.

In order to meet the State's dissolved oxygen standard and the embayment's chlorophyll-a management goals, the recommended effluent limits for a 40 mgd discharge for the Arlington County pollution control plant are as follows:

Constituent	Effluent Limit
Dissolved Oxygen (DO)	6.0 mg/L year-round
5-day Carbonaceous Biochemical Oxygen Demand (CBOD5)	10.0 mg/L year-round
Total Kjeldahl Nitrogen (TKN)	No nitrification required
Total Phosphorus (TP)	1.0 mg/L*

*The effluent limit is based on the simulation of the low-flow, high-temperature design conditions. Future studies that evaluate effluent constraints for the main stem of the Potomac will consider the feasibility of seasonal phosphorus removal standards.

To protect the main stem of the Potomac Estuary, an interim total phosphorus limit of 0.18 mg/L is regionally accepted as presented in the Interim Control Policy of the 1986 208 Plan Supplement (Wash. COG, 1986). Therefore, at the present time, the more restrictive limit on total phosphorus is the 0.18 mg/L for protection of the main stem Potomac. As indicated in the 208 Plan Supplement, future long-term Potomac Studies being mutually undertaken by COG, the states and EPA will better define the total phosphorus limits required for Potomac main stem protection.

9 VAC 25-415-10 ET SEQ. - Policy for the Potomac River Embayments

9 VAC 25-415-10. Purpose.

This chapter provides for the control of point source discharges into the Virginia embayment waters of the Potomac River from the fall line at Chain Bridge in Arlington County to the Route 301 Bridge in King George County.

This chapter also constitutes Special Standard 'b' in the State Water Control Board's Water Quality Standards "Special Standards and Requirements" (9 VAC 25-260-310) for the Potomac River Basin's Potomac River Subbasin (9 VAC 25-260-390).

9 VAC 25-415-20. Affected waters.

This chapter shall apply to all embayments and their tidal and non-tidal tributaries, including their headwaters, of the Potomac River, from the fall line at Chain Bridge in Arlington County to the Route 301 Bridge in King George County. The Occoquan River watershed, upstream of the fall line at the Occoquan Dam, shall not be subject to the terms of this chapter, since those waters are governed by the Occoquan Policy (9 VAC 25-410-10 et seq.).

9 VAC 25-415-30. Policy requirements.

A. Existing discharges shall meet the requirements of 9 VAC 25-415-40 within five years from the effective date of this chapter, unless exempted under subsection B., C., or D of this section. New dischargers shall meet the requirements of 9 VAC 25-415-40 immediately.

B. Existing discharges with design flows less than 0.05 mgd shall be exempt from meeting the requirements of 9 VAC 25-415-40 until the completion of their next design flow expansion.

C. Failing Septic Systems - Existing residential homes, industrial and commercial operations, public facilities, and any other operation where a septic drainfield system has failed shall be exempt from the requirements of 9 VAC 25-415-40, provided that the applicant demonstrates that it is not feasible to connect to a publicly-owned treatment plant and that there is no feasible alternative except to discharge. Discharge permits shall be issued in conformance with the Virginia Permit Regulation (9 VAC 25-31-10 et seq.) and Virginia General VPDES Permit Regulation for sewage discharges less than or equal to 1,000 gallons per day (9 VAC 25-110-10 et seq.).

D. Other Exemptions - The requirements of 9 VAC 25-415-40 shall not apply to the following types of discharges: combined sewer overflows, stormwater, corrective action remediation, and industrial discharges where BOD and nutrients are not primary pollutants of concern.

9 VAC 25-415-40. Effluent limitations.

The following effluent limitations shall apply to all sewage treatment plants:

Parameter	Monthly Avg (mg/l)
$CBOD_5$	5
Total Suspended Solids	6
Total Phosphorus	0.18
NH_3 (Apr 1 - Oct 31)	1

The above limitations shall not replace or exclude the discharge from meeting the requirements of the State's Water Quality Standards (9 VAC 25-260-10 et seq.).

9 VAC 25-415-50. Water quality modeling.

Water quality models may be required to predict the effect of wastewater discharges on the water quality of the receiving waterbody, the embayment, and the Potomac River. The purpose of the modeling shall be to determine if more stringent limits than those required in 9 VAC 25-415-40 are required to meet water quality standards. If modeling demonstrates the necessity for more restrictive limits, the more restrictive limits shall apply. Where needed, modeling shall account for and address previous modeling exercises and shall include all relevant point and non-point sources. All models shall undergo a peer review process. The models and modeling results shall be considered during the public participation process to ensure proper public input into the modeling process. The models shall be documented and certified by the Virginia Department of Environmental Quality for use in preparing VPDES permits for discharges to the Potomac Embayments and the Potomac River. All changes and modifications to the models shall receive peer review and be appropriately documented. Documentation on the models shall include the basis and reasoning for the recommended models including inputs and assumptions. The rationale shall be described in non-technical language so someone who is reasonably familiar with water pollution problems can understand the inputs and the reasons behind them.

9 VAC 25-415-60. Administrative review.

Within three years after the effective date of this chapter, the department shall perform an analysis on this chapter and provide the board with a report on the results. The analysis shall include (i) the purpose and need for the chapter, (ii) alternatives which would achieve the stated

purpose of this chapter in a less burdensome and less intrusive manner, (iii) an assessment of the effectiveness of this chapter, (iv) the results of a review of current state and federal statutory and regulatory requirements, including identification and justification of requirements of this chapter which are more stringent than federal requirements, and (v) the results of a review as to whether this chapter is clearly written and easily understandable by affected entities.

Upon review of the department's analysis, the board shall confirm the need to (i) continue this chapter without amendment, (ii) repeal this chapter or (iii) amend this chapter. If the board's decision is to repeal or amend this chapter, the board shall authorize the department to initiate the applicable regulatory process to carry out the decision of the board.

APPENDIX A
SCHEDULE OF COMPLIANCE

1. The County shall develop and submit for DEQ's review and approval, within three months of the effective date of this Order, a plan and schedule for a pilot project to determine the actual cost of disconnection and/or mitigation of inflow sources such as house laterals, sump pumps and housing foundation drains connected to the WPCP's collection system. Upon its review and approval said plan and schedule shall become a part of and enforceable under the terms of this Order. Within 60 days of completion of the pilot project, the findings shall be sent to DEQ. The findings of the pilot project will be used to confirm the County consultant's previously estimated costs for disconnection of house foundation drains. In addition, said findings shall be the basis for a plan and schedule for additional wet weather flow controls including but not limited to I/I reduction or further WPCP improvements should WPCP improvements prove insufficient to reduce the amount and frequency of bypasses at the facility, as is discussed in paragraph 2 below. Such plan and schedule shall be submitted to DEQ for review and approval within 90 days of completion of the pilot project.

2. Should DEQ determine that an approximate 50% reduction in the volume and frequency of WPCP bypasses has not been realized by December 2008, the County shall, within 30 days of notification by DEQ, implement the plan and schedule referenced in paragraph 1 above. DEQ shall use calendar year 2003 as the baseline year for making the determination of reduction required by this paragraph.

3. The County shall develop and conduct an updated Sewer System Evaluation Study (SSES) to identify and prioritize sources of I/I for elimination from the collection system and submit to DEQ no later than July 1, 2006, in a Final Report, conclusions, supporting documentation, and recommendations and a schedule for implementation of specific I/I reduction projects, based on the SSES. Upon DEQ's review and approval of the schedule and recommendations they shall become a part of and enforceable under the terms of the Order.

4. The County shall submit an annual progress report on I/I reduction activities to DEQ on each July 1, through termination of this Order. The Report shall identify actions completed during the previous year.

5. By no later than December 31, 2007, the County shall complete construction of the DP-1 equalization tanks in accordance with approved plans and specifications.

6. By no later than December 31, 2008, the County shall complete construction of the new aeration tanks and secondary clarifiers Nos. 7 and 8, to be installed as part of the DP-2 project, in accordance with approved plans and specifications.

7. By no later than June 30, 2011, the County shall complete construction of secondary clarifier #9, to be installed as part of the DP-2 project in accordance with approved plans and specifications.

8. By no later than February 28, 2012, the County shall complete the retrofit of the WCPS's existing aeration tanks and secondary clarifiers in accordance with approved plans and specifications.

9. Should the County experience problems or disruptions in meeting the construction schedule outlined in Appendix A, paragraphs 5-8 above, the County may submit to DEQ, a revised construction plan and schedule. Said plan and schedule shall be submitted to DEQ within 30 days of the County becoming aware of a condition which may affect its ability to complete the action items referenced in paragraphs 5-8 above in a timely fashion. If DEQ determines that good cause exists, DEQ may approve reasonable plan and schedule revisions, provided that it will not adjust the deadline in paragraph 8 by more than 24 months.

10. During the period of construction, the County may experience additional violations of the same Permit conditions, which necessitated the MP01 upgrades. Accordingly, pending completion of construction, the County will use its best efforts to maximize treatment of wet weather flows at the WPCP and minimize bypasses during the construction period.

11. During the period beginning with the effective date of this Order and lasting through completion of the construction in accordance with the schedule outlined herein, the County shall monitor and limit the discharge from the WPCP in accordance with VPDES Permit No. VA0025143, except that weekly average Permit effluent limitations shall not apply during the construction period. Upon completion of construction and issuance of the CTO, but in no event later than May 1, 2012, weekly average Permit effluent limitations shall again become applicable in accordance with the Permit. The County shall operate the WPCP during the construction period in a workman-like manner to maximize treatment efficiencies.

12. The County shall submit quarterly construction progress reports to DEQ, discussing the projects contemplated in paragraphs 5 through 8 above, along with the WCPS' DMR until all projects are complete.

Rec'd 9/25/07

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

L. Preston Bryant, Jr.
Secretary of Natural Resources

NORTHERN VIRGINIA REGIONAL OFFICE
13901 Crown Court, Woodbridge, Virginia 22193
(703) 583-3800 Fax (703) 583-3801
www.deq.virginia.gov

David K. Paylor
Director

~~Jeffery A. Steen~~
Regional Director

September 26, 2007

Mr. Larry Slattery
Bureau Chief
Department of Environmental Services
3402 South Glebe Road, 3rd Floor
Arlington, VA 22202

Dear Mr. Slattery:

The Department of Environmental Quality, Northern Virginia Regional Office (DEQ-NRO) has completed review of Arlington's letter dated July 20, 2007 both requesting revisions to specific compliance dates pursuant to the 2005 Consent Order and also relief from its permitted ammonia limits during the period of construction at the facility.

DEQ-NRO finds that the extension request is reasonable provided that Arlington is still able to comply with the deadline set forth in Appendix A, item # 8 of the 2005 Consent Order. Therefore, the updated schedule submitted as part of Arlington's letter dated July 20, 2007 is approved.

With regards to the relief from ammonia limits, after a thorough review of the data provided by Arlington, DEQ-NRO is unable to provide relief for Arlington's permitted ammonia limits at this time. However, DEQ-NRO is prepared to exercise its enforcement discretion with regards to any future ammonia exceedances upon a showing by Arlington that the direct cause of the exceedance was treatment deficiency caused by construction required pursuant to the 2005 Consent Order.

Please contact me if you have any additional questions or comments. I may be reached at 703-583-3850.

Respectfully,

Sarah Baker

Sarah Baker
Regional Enforcement Manager

EXHIBIT C

PROJECT SCHEDULE

Grantee: Arlington County
Grant: #440-S-07-10

The Grantee has proposed the following schedule of key activities/milestones as a planning tool which may be subject to change. In particular, the Grantee acknowledges that the appropriate approval (Certificate to Construct) must be issued by the Department prior to proceeding with construction. Unless authorized by a grant modification, it is the responsibility of the Grantee to adhere to the anticipated schedule for the project as follows:

Activity	Date/Duration
a. Complete construction of Equalization Tanks, pump station, North and South Ferric Feed Facilities, and Odor Control.	July 31, 2009
b. Complete the remainder of Phase 7A including: Deep Bed Denitrification Filter Building with Chlorine Contact Tank, Sodium Hypochlorite Feed Facility, Refurbished Plant Effluent Water Pump Station, Post Aeration System, Sodium Bisulfite Feed Facility, Methanol Feed Facility, and Electrical Distribution Center Replacement.	Oct. 31, 2010
c. Request CTO for Phase 7A.	Oct. 31, 2010
d. Complete construction of various phase 7B components including: Aeration Tanks 5 and 6, Secondary Clarifiers 7 and 8, West Secondary Services and ASE2 Pump Station, Blowers 3, 4 and 5, and the Mixed Liquor Flow Distribution Structures.	March 30, 2010
e. Complete the remainder of Phase 7B including: PTB Backup, Primary Clarifier Modifications, Operations Control Bldg Modifications, Remaining Blower Building Modifications, Existing Aeration Tank 1-4 Modifications, Foam Collection Pump Station, Surface Waste Pump Station, Existing Secondary Clarifier Modifications, East Secondary Services and ASE1 Pump Station Modifications, Primary Effluent Flume, Backwash Storage Tanks, and Electrical Distribution Centers.	July 31, 2011
f. Request CTO for Phase 7B.	August 31, 2011

Revised 2/2003

State "Transmittal Checklist" to Assist in Targeting
Municipal and Industrial Individual NPDES Draft Permits for Review

Part I. State Draft Permit Submission Checklist

In accordance with the MOA established between the Commonwealth of Virginia and the United States Environmental Protection Agency, Region III, the Commonwealth submits the following draft National Pollutant Discharge Elimination System (NPDES) permit for Agency review and concurrence.

Facility Name:	The Arlington County WPCP
NPDES Permit Number:	VA00025143
Permit Writer Name:	Anna Westernik
Date:	May 14, 2008

Major [ ] **Minor** [X] **Industrial** [ ] **Municipal** [x]

I.A. Draft Permit Package Submittal Includes:	**Yes**	**No**	**N/A**
1. Permit Application?	x		
2. Complete Draft Permit (for renewal or first time permit – entire permit, including boilerplate information)?	x		
3. Copy of Public Notice?	x		
4. Complete Fact Sheet?	x		
5. A Priority Pollutant Screening to determine parameters of concern?	x		
6. A Reasonable Potential analysis showing calculated WQBELs?	x		
7. Dissolved Oxygen calculations?		x	
8. Whole Effluent Toxicity Test summary and analysis?	x		
9. Permit Rating Sheet for new or modified industrial facilities?			x

I.B. Permit/Facility Characteristics	**Yes**	**No**	**N/A**
1. Is this a new, or currently unpermitted facility?		x	
2. Are all permissible outfalls (including combined sewer overflow points, non-process water and storm water) from the facility properly identified and authorized in the permit?	x		
3. Does the fact sheet **or** permit contain a description of the wastewater treatment process?	x		
4. Does the review of PCS/DMR data for at least the last 3 years indicate significant non-compliance with the existing permit?*		x	
5. Has there been any change in streamflow characteristics since the last permit was developed?		x	
6. Does the permit allow the discharge of new or increased loadings of any pollutants?		x	
7. Does the fact sheet **or** permit provide a description of the receiving water body(s) to which the facility discharges, including information on low/critical flow conditions and designated/existing uses?	x		
8. Does the facility discharge to a 303(d) listed water?	x		
a. Has a TMDL been developed and approved by EPA for the impaired water?	x		
b. Does the record indicate that the TMDL development is on the State priority list and will most likely be developed within the life of the permit?			x
c. Does the facility discharge a pollutant of concern identified in the TMDL or 303(d) listed water?	x		
9. Have any limits been removed, or are any limits less stringent, than those in the current permit?		x	
10. Does the permit authorize discharges of storm water?		x	

Attachment 16

I.B. Permit/Facility Characteristics – cont.	Yes	No	N/A
11. Has the facility substantially enlarged or altered its operation or substantially increased its flow or production?		x	
12. Are there any production-based, technology-based effluent limits in the permit?		x	
13. Do any water quality-based effluent limit calculations differ from the State's standard policies or procedures?		x	
14. Are any WQBELs based on an interpretation of narrative criteria?		x	
15. Does the permit incorporate any variances or other exceptions to the State's standards or regulations?*	x		
16. Does the permit contain a compliance schedule for any limit or condition?	x		
17. Is there a potential impact to endangered/threatened species or their habitat by the facility's discharge(s)?	x		
18. Have impacts from the discharge(s) at downstream potable water supplies been evaluated?			x
19. Is there any indication that there is significant public interest in the permit action proposed for this facility?		x	
20. Have previous permit, application, and fact sheet been examined?	x		

*TRC concentration in the chlorine contact tank.

Part II. NPDES Draft Permit Checklist

Region III NPDES Permit Quality Checklist – for POTWs
(To be completed and included in the record only for POTWs)

II.A. Permit Cover Page/Administration	Yes	No	N/A
1. Does the fact sheet or permit describe the physical location of the facility, including latitude and longitude (not necessarily on permit cover page)?	x		
2. Does the permit contain specific authorization-to-discharge information (from where to where, by whom)?	x		

II.B. Effluent Limits – General Elements	Yes	No	N/A
1. Does the fact sheet describe the basis of final limits in the permit (e.g., that a comparison of technology and water quality-based limits was performed, and the most stringent limit selected)?	x		
2. Does the fact sheet discuss whether "antibacksliding" provisions were met for any limits that are less stringent than those in the previous NPDES permit?			x

II.C. Technology-Based Effluent Limits (POTWs)	Yes	No	N/A
1. Does the permit contain numeric limits for ALL of the following: BOD (or alternative, e.g., CBOD, COD, TOC), TSS, and pH?	x		
2. Does the permit require at least 85% removal for BOD (or BOD alternative) and TSS (or 65% for equivalent to secondary) consistent with 40 CFR Part 133?	x		
a. If no, does the record indicate that application of WQBELs, or some other means, results in more stringent requirements than 85% removal or that an exception consistent with 40 CFR 133.103 has been approved?			x
3. Are technology-based permit limits expressed in the appropriate units of measure (e.g., concentration, mass, SU)?	x		
4. Are permit limits for BOD and TSS expressed in terms of both long term (e.g., average monthly) and short term (e.g., average weekly) limits?	x		
5. Are any concentration limitations in the permit less stringent than the secondary treatment requirements (30 mg/l BOD5 and TSS for a 30-day average and 45 mg/l BOD5 and TSS for a 7-day average)?		x	
a. If yes, does the record provide a justification (e.g., waste stabilization pond, trickling filter, etc.) for the alternate limitations?			x

II.D. Water Quality-Based Effluent Limits	Yes	No	N/A
1. Does the permit include appropriate limitations consistent with 40 CFR 122.44(d) covering State narrative and numeric criteria for water quality?	x		
2. Does the fact sheet indicate that any WQBELs were derived from a completed and EPA approved TMDL? (monitoring for PCBs only)		x	
3. Does the fact sheet provide effluent characteristics for each outfall?	x		
4. Does the fact sheet document that a "reasonable potential" evaluation was performed?	x		
a. If yes, does the fact sheet indicate that the "reasonable potential" evaluation was performed in accordance with the State's approved procedures?	x		
b. Does the fact sheet describe the basis for allowing or disallowing in-stream dilution or a mixing zone?	x		
c. Does the fact sheet present WLA calculation procedures for all pollutants that were found to have "reasonable potential"?	x		
d. Does the fact sheet indicate that the "reasonable potential" and WLA calculations accounted for contributions from upstream sources (i.e., do calculations include ambient/background concentrations)?		x	
e. Does the permit contain numeric effluent limits for all pollutants for which "reasonable potential" was determined?	x		

II.D. Water Quality-Based Effluent Limits – cont.	Yes	No	N/A
5. Are all final WQBELs in the permit consistent with the justification and/or documentation provided in the fact sheet?	x		
6. For all final WQBELs, are BOTH long-term AND short-term effluent limits established?	x		
7. Are WQBELs expressed in the permit using appropriate units of measure (e.g., mass, concentration)?	x		
8. Does the record indicate that an "antidegradation" review was performed in accordance with the State's approved antidegradation policy?	x		

II.E. Monitoring and Reporting Requirements	Yes	No	N/A
1. Does the permit require at least annual monitoring for all limited parameters and other monitoring as required by State and Federal regulations?	x		
a. If no, does the fact sheet indicate that the facility applied for and was granted a monitoring waiver, AND, does the permit specifically incorporate this waiver?			
2. Does the permit identify the physical location where monitoring is to be performed for each outfall?	x		
3. Does the permit require at least annual influent monitoring for BOD (or BOD alternative) and TSS to assess compliance with applicable percent removal requirements?	x		
4. Does the permit require testing for Whole Effluent Toxicity?	x		

II.F. Special Conditions	Yes	No	N/A
1. Does the permit include appropriate biosolids use/disposal requirements?	x		
2. Does the permit include appropriate storm water program requirements?			x

II.F. Special Conditions – cont.	Yes	No	N/A
3. If the permit contains compliance schedule(s), are they consistent with statutory and regulatory deadlines and requirements?	x		
4. Are other special conditions (e.g., ambient sampling, mixing studies, TIE/TRE, BMPs, special studies) consistent with CWA and NPDES regulations?	x		
5. Does the permit allow/authorize discharge of sanitary sewage from points other than the POTW outfall(s) or CSO outfalls [i.e., Sanitary Sewer Overflows (SSOs) or treatment plant bypasses]?	x		
6. Does the permit authorize discharges from Combined Sewer Overflows (CSOs)?			x
a. Does the permit require implementation of the "Nine Minimum Controls"?			x
b. Does the permit require development and implementation of a "Long Term Control Plan"?			x
c. Does the permit require monitoring and reporting for CSO events?			x
7. Does the permit include appropriate Pretreatment Program requirements?	x		

II.G. Standard Conditions	Yes	No	N/A
1. Does the **permit** contain all 40 CFR 122.41 standard conditions or the State equivalent (or more stringent) conditions?	x		

List of Standard Conditions – 40 CFR 122.41

Duty to comply	Property rights	Reporting Requirements
Duty to reapply	Duty to provide information	Planned change
Need to halt or reduce activity not a defense	Inspections and entry	Anticipated noncompliance
	Monitoring and records	Transfers
Duty to mitigate	Signatory requirement	Monitoring reports
Proper O & M	Bypass	Compliance schedules
Permit actions	Upset	24-Hour reporting
		Other non-compliance

2. Does the permit contain the additional standard condition (or the State equivalent or more stringent conditions) for POTWs regarding notification of new introduction of pollutants and new industrial users [40 CFR 122.42(b)]?	x		

Part II. NPDES Draft Permit Checklist

Region III NPDES Permit Quality Review Checklist – For Non-Municipals
(To be completed and included in the record for <u>all</u> non-POTWs)

II.A. Permit Cover Page/Administration	**Yes**	**No**	**N/A**
1. Does the fact sheet **or** permit describe the physical location of the facility, including latitude and longitude (not necessarily on permit cover page)?			
2. Does the permit contain specific authorization-to-discharge information (from where to where, by whom)?			

II.B. Effluent Limits – General Elements	**Yes**	**No**	**N/A**
1. Does the fact sheet describe the basis of final limits in the permit (e.g., that a comparison of technology and water quality-based limits was performed, and the most stringent limit selected)?			
2. Does the fact sheet discuss whether "antibacksliding" provisions were met for any limits that are less stringent than those in the previous NPDES permit?			

II.C. Technology-Based Effluent Limits (Effluent Guidelines & BPJ)	**Yes**	**No**	**N/A**
1. Is the facility subject to a national effluent limitations guideline (ELG)?			
a. If yes, does the record adequately document the categorization process, including an evaluation of whether the facility is a new source or an existing source?			
b. If no, does the record indicate that a technology-based analysis based on Best Professional Judgement (BPJ) was used for all pollutants of concern discharged at treatable concentrations?			
2. For all limits developed based on BPJ, does the record indicate that the limits are consistent with the criteria established at 40 CFR 125.3(d)?			
3. Does the fact sheet adequately document the calculations used to develop both ELG and /or BPJ technology-based effluent limits?			
4. For all limits that are based on production or flow, does the record indicate that the calculations are based on a "reasonable measure of ACTUAL production" for the facility (not design)?			
5. Does the permit contain "tiered" limits that reflect projected increases in production or flow?			
a. If yes, does the permit require the facility to notify the permitting authority when alternate levels of production or flow are attained?			
6. Are technology-based permit limits expressed in appropriate units of measure (e.g., concentration, mass, SU)?			
7. Are all technology-based limits expressed in terms of both maximum daily, weekly average, and/or monthly average limits?			
8. Are any final limits less stringent than required by applicable effluent limitations guidelines or BPJ?			

II.D. Water Quality-Based Effluent Limits	**Yes**	**No**	**N/A**
1. Does the permit include appropriate limitations consistent with 40 CFR 122.44(d) covering State narrative and numeric criteria for water quality?			
2. Does the record indicate that any WQBELs were derived from a completed and EPA approved TMDL?			
3. Does the fact sheet provide effluent characteristics for each outfall?			
4. Does the fact sheet document that a "reasonable potential" evaluation was performed?			
a. If yes, does the fact sheet indicate that the "reasonable potential" evaluation was performed in accordance with the State's approved procedures?			
b. Does the fact sheet describe the basis for allowing or disallowing in-stream dilution or a mixing zone?			

II.D. Water Quality-Based Effluent Limits – cont.	Yes	No	N/A
c. Does the fact sheet present WLA calculation procedures for all pollutants that were found to have "reasonable potential"?			
d. Does the fact sheet indicate that the "reasonable potential" and WLA calculations accounted for contributions from upstream sources (i.e., do calculations include ambient/background concentrations where data are available)?			
e. Does the permit contain numeric effluent limits for all pollutants for which "reasonable potential" was determined?			
5. Are all final WQBELs in the permit consistent with the justification and/or documentation provided in the fact sheet?			
6. For all final WQBELs, are BOTH long-term (e.g., average monthly) AND short-term (e.g., maximum daily, weekly average, instantaneous) effluent limits established?			
7. Are WQBELs expressed in the permit using appropriate units of measure (e.g., mass, concentration)?			
8. Does the fact sheet indicate that an "antidegradation" review was performed in accordance with the State's approved antidegradation policy?			

II.E. Monitoring and Reporting Requirements	Yes	No	N/A
1. Does the permit require at least annual monitoring for all limited parameters?			
a. If no, does the fact sheet indicate that the facility applied for and was granted a monitoring waiver, AND, does the permit specifically incorporate this waiver?			
2. Does the permit identify the physical location where monitoring is to be performed for each outfall?			
3. Does the permit require testing for Whole Effluent Toxicity in accordance with the State's standard practices?			

II.F. Special Conditions	Yes	No	N/A
1. Does the permit require development and implementation of a Best Management Practices (BMP) plan or site-specific BMPs?			
a. If yes, does the permit adequately incorporate and require compliance with the BMPs?			
2. If the permit contains compliance schedule(s), are they consistent with statutory and regulatory deadlines and requirements?			
3. Are other special conditions (e.g., ambient sampling, mixing studies, TIE/TRE, BMPs, special studies) consistent with CWA and NPDES regulations?			

II.G. Standard Conditions	Yes	No	N/A
1. Does the **permit** contain all 40 CFR 122.41 standard conditions or the State equivalent (or more stringent) conditions?			

List of Standard Conditions – 40 CFR 122.41

Duty to comply	Property rights	Reporting Requirements
Duty to reapply	Duty to provide information	Planned change
Need to halt or reduce activity not a defense	Inspections and entry	Anticipated noncompliance
	Monitoring and records	Transfers
Duty to mitigate	Signatory requirement	Monitoring reports
Proper O & M	Bypass	Compliance schedules
Permit actions	Upset	24-Hour reporting
		Other non-compliance

2. Does the permit contain the additional standard condition (or the State equivalent or more stringent conditions) for existing non-municipal dischargers regarding pollutant notification levels [40 CFR 122.42(a)]?			

Part III. Signature Page

Based on a review of the data and other information submitted by the permit applicant, and the draft permit and other administrative records generated by the Department/Division and/or made available to the Department/Division, the information provided on this checklist is accurate and complete, to the best of my knowledge.

Name	Anna Westernik
Title	Environmental Specialist II
Signature	A Westernik
Date	May 14, 2008